RAILROAD GAZETTE

FRIDAY, FEBRUARY 25, 1881.

The Genealogy of the Locomotive on the Baltimore & Ohio Railroad.

Last autumn when the "sesqui-centennial" celebration of the founding of Baltimore was celebrated in that city, the Baltimore & Ohio Railroad reproduced, as accurately as was possible, full-sized models of several devices which were tried as motive power on that line in its early days. These models were exhibited in the procession which was one of the features of the occasion.

It may be said that the drawings from which these models were made were prepared by Mr. John H. B. Latrobe, a brother of the late Benjamin Latrobe, the distinguished engineer, from the most authentic sources in existence. To some extent though the reproductions were dependent upon the memory of those who were contemporaries of the early experiments in which the devices illustrated were used.

Fig. 1 represents the "Æolus," a sail-car, of which the motive power was the wind. This was devised by Evan Thomas in 1830. In "A History and Description of the Baltimore & Ohio Railroad," published in 1853, it is said:

"This railroad, being the first one in operation in the country, and almost in the world for the transportation of passengers and merchandise, of course attracted visitors from almost every section of the United States, as well as from some parts of Europe. Among them, as detailed in a letter of recent date, from Evan Thomas to George Brown, was Baron Krudener, envoy from the Emperor of Russia, who made an excursion in the sailing car, managing the sail himself. On his return from the excursion he declared he had never before traveled so agreeably, and remarked that he 'would send his suite from Washington to enjoy sailing on the Railroad.' The president of the company caused a model sailing car to be constructed, fitted with Winans' friction wheels, which he presented to him to be forwarded to the Emperor."

Fig. 2 is what may be called a horse, or more accurately a mule-power locomotive. It had, as shown, a tread-mill horse-power which was connected with one of the axles by a belt, as indicated by the dotted lines. We have no information about the origin or working of this "Pioneer of the Locomotive."

Fig. 3 is Peter Cooper's locomotive, which history tells us was the first locomotive built in America. Its history has been written so often that it is hardly worth while to repeat it again. An impressive fact about it though is, that its author is still living, and that it dates only a little more than 50 years ago, and that all the advance made since has been in what seems like a comparatively short period of time.

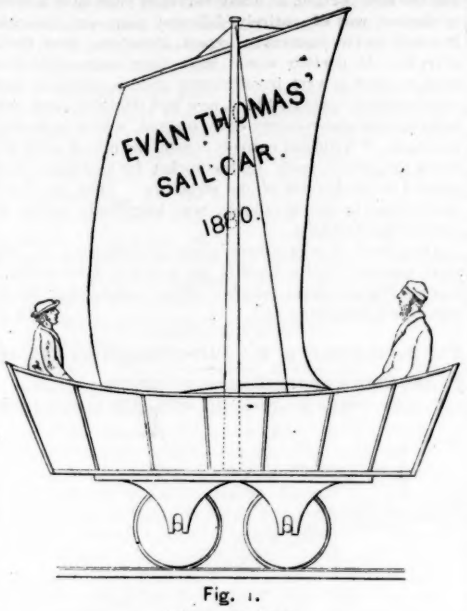

Fig. 1.
THE ÆOLUS.

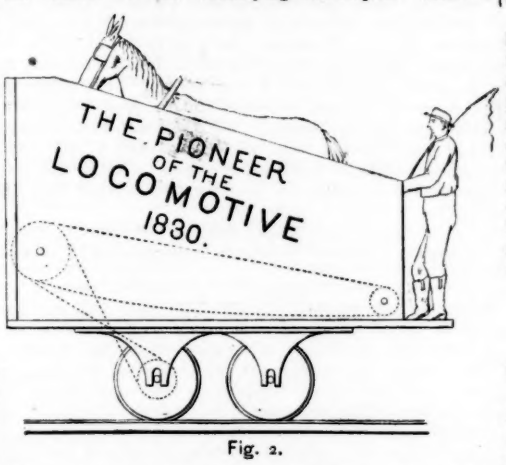

Fig. 2.

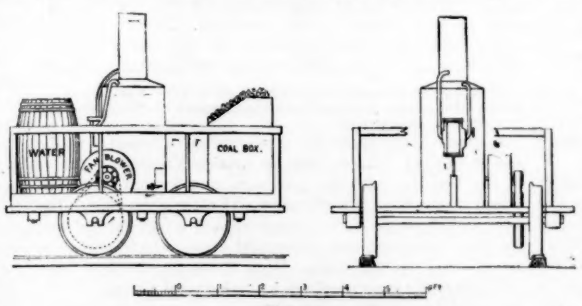

Fig. 3.
THE FIRST LOCOMOTIVE BUILT IN AMERICA.

Contributions.

The Steel Rail Discussion at Philadelphia.

TO THE EDITOR OF THE RAILROAD GAZETTE:

As one interested in the growth in strength and usefulness of the American Institute of Mining Engineers and kindred societies, I wish to call attention to the meeting of that Society, held last week in Philadelphia. The American Institute of Mining Engineers was, I believe, organized for the avowed purpose of increasing our knowledge of the topics coming naturally within its scope, and to stimulate scientific research. To this end men of eminence have added their names to its lists. We are, therefore, justified in expecting from them hints which will be useful to the consumer as well as the producer.

To the general observer, the discussion, at the meeting referred to, could not fail to leave the impression that it was the aim of some of the papers written on steel rails from the producer's standpoint to detract from the usefulness of one written from that of the consumer, by insinuating, and, in one case, undignified language.

This is unworthy the good name of the Institute, and an act which cannot be too strongly deprecated by its managers. It is the purpose of this communication to express, through your columns, the disappointment of myself and others, who, coming from a distance to listen to a discussion of this particular paper (which had been very kindly distributed by the Secretary of the Institute to a large number of railroad managers), were obliged to return with the feeling that our time had not been well spent in listening to a discussion much of which added little or nothing to previous information; did not appear to be upon the merits of the question, and was very little to the points at issue. ****

The Engine-Driver at his Best.

TO THE EDITOR OF THE RAILROAD GAZETTE:

He stands about five feet nine inches from the soles of his stockings, and is rather over the average weight for that height. His muscles are hard and rigid, but well-padded with fat; his face is full and rosy; the head large and the hair dark and not very fine. There is a general expression of a man in good condition about him. His nerves are evidently too well fed to be either irritable or restless, and his face has a cheerful, contented expression. His most characteristic features, however, are his mouth and eyes. His chin is broad, and his mouth is almost always shut, and the lips well closed over the teeth. There is a set rather than a strained expression of the lip muscles; they easily relax into a smile. The best of the man, however, is still to be told, namely, his eyes.

These have a far-away look out of them with a peculiar strain on the iris muscles—a sort of fixed, steady intensity about them, which has no suggestion of excitement in it. Their most characteristic expression, however, is an expression of mastery, of calm, yet almost intense self-respect. You have only to look into the man's eyes to know his history. They look duty, duty faithfully done. Study them a moment and you see that this is the source of the underlying self-respect which is the centre of the man's character, and which, with a deep and hearty affection for his family, completely saves him from being a machine. For there is much of the machine about him. Watch him closely, and you will discover that away from home he is never quite at ease unless on or near his engine. He talks about politics, he reads a little, now and then he plays a game of cards or checkers, or he takes a stroll; but it is all with the air of a man who has something else to do, who is merely passing time, not doing anything which belongs to him to do as a man. His one duty (aside from his duty to his family), is to run No. 299, and keep her fit for the road.

If you could get to the bottom of him, you would find that he had at times a certain uneasy sense of not having made the best of himself; yet, strange to say, this very uneasiness makes him stick closer to his engine. The man is quietly proud, justly proud, of his record, but this secret uneasy sense of personal failure keeps his pride mellow, and the man is strangely open to any earnest words, so that they are earnest about life and living.

Yet, although he is open to words, and his better feelings are not difficult to touch, he is a man whom it is very hard to get to change his course in any way, unless the influence comes to him through one of two channels. There are several men on the road for whom he has a thorough respect: he will always do what they do. He has a profound regard for general orders and will obey them in every respect.

Take him all in all, if he could be made larger and broader mentally, the engine-driver at his best would be a man such as this world stands much in need of.

Incompetent Switchmen.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The great number of railroad casualties due to misplaced switches must be attributed in a great measure, if not entirely, to gross carelessness or incompetence on the part of trainmen as well as switchmen, for it would not be fair to assume that only the latter class of employés were guilty of leaving switches misplaced. But when we look upon the army of switchmen, and the vast number of switches that are liable to be misplaced, and when we consider of what poor material some of the aforesaid switchmen are composed, it is not surprising that there are so many derailments, but the great wonder is that there are not more.

In this connection it may be well to inquire what is expected of a first-class switchman. In the first place he must be strictly temperate and reliable. He is expected to be on duty from 12 to 14 and 15 hours a day, almost constantly on his feet, and exposed to all sorts of weather. He is responsible for the safety of all trains and engines passing over the switches under his control. He must keep his lamps, flags, etc., in good order, and ready for immediate use. He is required to be on the constant watch for approaching trains, and to give them the safety signal if all is right, or stop them if the line is blocked.

He must be a man of nerve and judgment, and must be able to think and act quickly in cases of emergency. His position is one of great responsibility, and any error or oversight on his part may produce disastrous results. Yet this man, with so much depending upon the faithful discharge of his duties, is paid from $35 to $45 per month, and probably on this magnificent salary he has to support a large family

Here we may find the reason why there are so many worthless and incompetent men placed in these positions. A man with any snap or energy can earn as much, if not more, at almost any other work, with considerably less exposure, and with a very small fractional part of the responsibility.

Let our railroad superintendents hire good "stock" (as you have expressed it) to begin with, and let the men be paid a fair compensation for a day's work. Train these men thoroughly in their duties, follow them up sharply, and hold them to a strict accountability for the performance of the same. It is comparatively an easy matter to sit in an office and make gilt-edged rules and regulations, but quite another thing to know that they are strictly carried out. Let these men know that their services are appreciated, and that some one else beside the paymaster is aware of their existence. Then we shall have a better class of switchmen—men who are interested in their duties, and the *Gazette* will have fewer accidents to record chargeable to misplaced switches.

*

A Wild Turkey in a Headlight.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The incident published in the *Gazette* "Scrap Heap" for Dec. 31, recalls a similar one that occurred many years ago. In the winter of 1855-56, the Memphis & Charleston Railroad had been opened from Memphis to Pocahontas, a distance of 75 miles. One passenger train was run daily each way, that is to say, out in the morning and back at night. The conductor and engineer of this train were respectively Mr. Tracy Robinson and Mr. John Whalley, both of whom will doubtless be remembered by Southern railroad men of that date. One afternoon, on the return trip, while running down a long grade near Middleton Station, at a high rate of speed, a flock of wild turkeys was run into, as it was crossing the track, and a fine large gobbler caught in the headlight. The fireman brought him in alive, and he was taken as a trophy to the Worsham House, Memphis, where a big dinner and good time were the result.

ASPINWALL, Isthmus of Panama.

An Elementary Problem.

TO THE EDITOR OF THE RAILROAD GAZETTE:

If an engine will run one mile in 45 seconds, how many miles will she run in one hour at the same rate of speed. I have had a warm argument on the question and would be very much obliged if you answer it through the *Gazette's* columns. ENGINEER.

[The way in which some of the excessively mathematical writers would solve this question would be somewhat as follows: Let x = the number of seconds consumed in running one mile; T = 1 hour the total time that the engine runs; a = the number of minutes in an hour, and b the number of seconds in a minute and S the speed in miles per hour. Then

$$S = \frac{T \times a \times b}{x}.$$

Substituting the values of these symbols we have,

$$S = \frac{1 \times 60 \times 60}{45} = 80 \text{ miles per hour.}$$

A person with a little common sense and some knowledge of arithmetic would say that if the engine

runs one mile in each 45 seconds, all we must do to find out how far it will run in an hour is to divide the total number of seconds in an hour by 45. As there are 60 minutes in an hour and 60 seconds in a minute, the result may be ciphered out as follows:

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60
60
---
45)3600(80 miles per hour.
360
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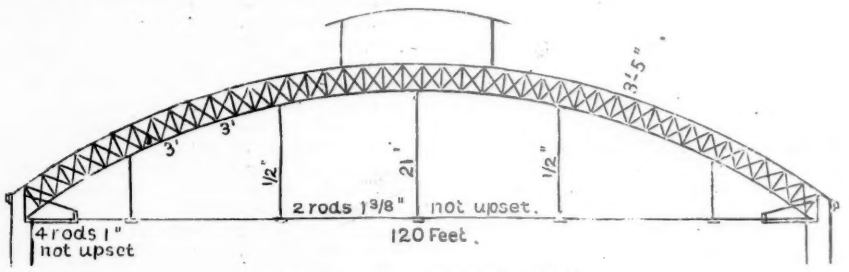
Our correspondent is therefore wrong, and if he has bet anything to eat or drink on the result we will expect him to divide the stakes with us.—EDITOR RAILROAD GAZETTE.]

The Roof of the Buffalo Depot.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I took occasion two days after the late "accident" to the Buffalo depot of the New York Central & Hudson River Railroad, to examine it with such care as was possible between trains. The ruins had been pretty thoroughly cleared away in the mean time, but three of the original trusses were still standing, and about 30 feet of one of the fallen trusses, with a great quantity of tie-rods and other *débris* still remained, from which measurements could be obtained. I inclose herewith a sketch of the roof and of the details of a single panel. I also inclose a piece of the wood



ROOF TRUSS, BUFFALO DEPOT.

from the single fragment of the trusses which I was able to examine.

It required no long time to find that the roof fell for a very old-fashioned reason—one not entirely disconnected with the fall of a roof at the other terminus of the same railroads in Madison square—it simply was not strong enough to hold itself up. It is not, possibly, quite so bad a case, for it once was just strong enough, and it had no such conspicuous defects which the eye could detect without any mathematical or physical examination. It was, in fact, a fairly safe and creditable roof when engineering was young and its wood was sound, twenty-six years ago; and it is unmistakably plain that this twenty-six years of faithful service was regarded as sufficient evidence in itself that it was good for a few years more; for anything like a thorough examination would have revealed that its wood was punk and anything like a computation of strains would have revealed that it had no margin to spare for the ravages of time.

Let us see about this: The roof, including the sky-light and ventilator at the top, probably weighed about 10 lbs. per square foot. It is in a city especially liable to heavy winds and deep snows, and 20 lbs. per square foot is ordinarily considered no more than a safe allowance. In that case, supposing the load uniformly distributed (the trusses being 26 ft. apart we have $20 \times 120 = 2{,}400$ sq. ft. $\times 30 = 72{,}000$ lbs. load per truss, and $\frac{72{,}000 \times 120}{21 \times 8} = 54{,}400$ lbs. as the compressive strain on the chords of the arch at the centre and as the tension on the tie-rods. The compression at the ends of the arch would be somewhat greater, but that may be neglected.

To resist this strain we have in the arch, two 3 × 12 chords reduced to an effective section of about 3 × 9 by holes cut every 3 ft. to admit the angle-block tubes. This gives an effective section of 545 square inches and a strain per square inch of scant 1,000 lbs., say one-third the breaking load.

In the tie-rods we have two rods of 1⅜ in., not upset, or 4 rods, 1 in., not upset, giving in either case an effective section of about 2 square inches, or 25,700 lbs. per square inch.

The truss, however, was probably computed for a lighter load, say 20 lbs. per square foot, and hence for its day and generation, 26 years ago, it was not so bad. To be sure, no great amount of *inequality* of load was necessary entirely to relieve certain parts of the arch of strain and double the strain on other parts, for the arch from its slight depth is extremely weak against such partial loads; but on the other hand, was, perhaps, lighter than 10 lbs. per square foot and rarely exposed to more than 15 lbs. per square foot in all. It certainly was not at the time of its collapse.

The immediate cause of apparent excuse for said collapse was apparently a considerable accumulation of snow on one side of the roof (I was told only two or three feet; perhaps it was more), while the other side was entirely bare. This seems clear, because the fracture began, or is said to have begun, where the snow was deepest. But the true cause was that the structure was verging rapidly on utter rottenness. The single piece which I saw—which had been broken clean off—was reduced by decay to one-half at most of its former strength. The splinters which I send you are a perfectly fair sample of the entire break. What then must have been the condition of the joints, all of which were, so far as I could detect by careful observation, plain butt joints? The snow caused the "accident" only in the sense that just before the strength of such a structure is utterly gone something a little out of the common course is sure to happen (as it is always happening) to bring matters to a crisis.

The occurrence is the more inexcusable because the Buffalo depot has recently been undergoing a thorough overhauling. The length of the train-house was first doubled, and the new portion, as many travelers must have wondered to observe, was of entirely different plan and dimensions. It would be but natural to expect, therefore, that then, if ever, the old portion would have been thoroughly examined, to see if it were in sufficiently good condition to justify such unsightly patchwork. A new and semi-detached station building had also recently been erected, which undoubtedly increased, if it did not entirely create, the pile of snow which broke the camel's back, by the pocket for the wind which it created on the lee side of the structure. Thus the faithful old servant, in its sere old age, was heartlessly loaded with still further burdens.

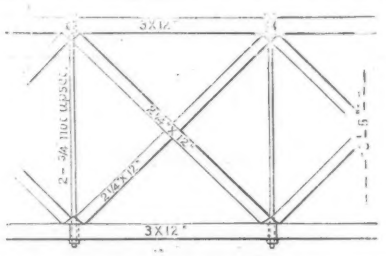
Altogether, it was a sorry piece of business. It was a sorry patchwork of a depot if the roof had never fallen. It was a sorry and shameful piece of carelessness that the roof was ever left there to fall. C. E.

The Development of the Austro-Hungarian Railroads.

TO THE EDITOR OF THE RAILROAD GAZETTE:

To make this theme perfectly intelligible to your readers, I am obliged to review the development of our railroads from the beginning, although cursorily sketched, with stress laid only upon the characteristics. Austria possessed, in 1825, the first railroad for public service, albeit worked by horses, between Manthausen and Linz, in Upper Austria, the origin of the present Linz-Budweis Railroad, connecting the two rivers, the Danube and the Moldau. Austria built the first steam railroad, according to our present notions, in 1837 (the third in Germany), *i. e.*, the line between Floridzdorf and Wagram, near Vienna, the stem of our richest railroad (Emperor Ferdinand Northern). Not till ten years later (1846) did Hungary open her first railroad for public service.

If we survey the development of our railroads, we are struck by their slow growth in comparison with those of



other countries. Our kingdom had the following length of railroads opened in kilometres (1 kilom. = 0.6213 English miles), as follows:

In	Austria.	Hungary.	Together.
1837	14	....	14
1840	144	....	144
1845	728	....	728
1850	1,357	222	1,579
1855	1,587	552	2,139
1860	2,925	1,611	4,536*

* The statistical data are given from the works: Statistics of the Austro-Hungarian Railroads, by the Ministry of Commerce, and J. Kohn's Annual Report.

A great programme for government railroads was designed in 1 41, with the aim to connect Vienna, the centre of the Empire, with the provinces and foreign countries, which was only partly executed and after some time. The year 1845 brought us, in consequence of a bad harvest and political complications, a financial crisis, which two years later struck our railroads. Here it was for the first time, self-help being known only to a small extent among us, that the state was obliged to interfere; the government absorbed nearly 50 per cent. of the then issued railroad stock for about 6,500,000 florins, Austrian currency [$3,200,000], whereby the state railroad system was prepared for; in the course of the first few years after 1850, the largest part of the existing railroads were bought up by the government.

So the first period of the history of our railroads ends with the state railroad system, but gives place to a new era with the sale of the state lines to private companies in 1855.

With this a wide, attractive field was opened for private activity, and the results were in the beginning quite satisfactory; but also here we soon experienced a back-stroke by disappointed hopes regarding the revenues, by unfavorable political and commercial circumstances. Our railroads recovered very slowly but steadily, and increased in prosperity in the four years from 1867 to 1869, assisted by an excellent conjuncture in grain production and traffic; if after that the years 1870 and 1871 show a falling off in spite of the spirit of enterprise flourishing on all other branches of industry we account for it by the fact that nearly all capital, attracted by so many promising new enterprises, shunned the railroad market; but still the activity in railroad construction was considerable, and reached in 1872 and 1873 its climax; but we find similar occurrences not only in Austria, but in nearly all other countries.

Before we proceed to the later years of the history of our railroads, I must submit some general remarks which have to be borne in mind. There is, first, the close connection between our transportation companies and the state by the so-called "system of guarantee," and second, the political and economical separation of the Empire into two halves, Austria and Hungary, since 1867, so that there exist only few common interests, for each part has its own railroad policy. As to the first point, it must be observed that nearly two-thirds of our railroads owe both their origin and existence to this "guarantee system," granted in many different forms, but the nature of which is, in general, that the state is responsible for the full payment of the interest on the *bonds*, for paying which the necessary amount is advanced to the companies, which return only 4 per cent. interest on it. How heavy this burden is which the state took upon its shoulders, and how rapidly it grew, will be seen by the following figures. The "subventions and dotations" given to five common (Austro-Hungarian) and to 16 Austrian railroads in round figures amounted to the following sums in successive years:

Year.	Florins.*	Year.	Florins.*
1868	200,000	1875	23,080,000
1869	3,400,000	1876	24,810,000
1870	5,910,000	1877	19,320,000
1871	8,590,000	1878	20,200,000
1872	10,580,000	1879	20,100,000
1873	16,450,000	1880	20,200,000
1874	18,260,000		

* An Austrian florin is about 48½ cents.

This amounts to about 190,000,000 florins capital, besides 25,000,000 florins interest, on which the state pays comparatively high interest itself, and which both principal and interest probably will not be paid for scores of years to come. We see that this burden has been developed from comparatively small beginnings to a highly important financial question, which, under certain circumstances, may prove dangerous to the credit of the state.

Once more returning to the history of the railroads of the western (Austrian) half of the monarchy, we are obliged to acknowledged the effort of the government to encourage private enterprise in building roads in different ways, as immunity from certain public burdens or other relief, etc., etc.; for that reason in 1871 there were applications for charters for not less than 3,700 kilometres of railroad, all of which were destined to fill up the palpable gaps in our railroad system. Unfortunately, the bill brought in by the government was not passed. Through our railroad history we see the willingness of the government to aid, and, on the other hand, the incomprehensible and often somewhat petty opposition of our Lower House to the best intentions of the government. Money for railroad construction became scarcer, chiefly because of the heavy losses which many railroad contractors had sustained, and that to such an extent, that in 1872, in spite of the state guarantee, no contractor could be found for the proposed completion of the Galician railroad system. In October of the same year one company fell a victim to a severe measure, "sequestration," not known till then. Sequestration means the removal of the general management, by virtue of the authority of the state, and the appointment of a government official to conduct the business of the company. The measure was occasioned by repeated disregard of the arrangements of the government secretary, frequent disturbances in the working of the line and chiefly the constantly growing demand upon the government treasury, while the earnings simultaneously increased, circumstances which did not escape the attention of our House of Representatives; these were the motives for the intervention of the government. The monster suit (Ofenheim) which was the consequence of this affair has become notorious far beyond the boundaries of Austria. The sequestration lasted for nearly three years.

The year of the crisis, 1873 (which may have had a purifying effect to a certain degree) gave to our railroads a tremendous blow; but we may add at once with great satisfaction that the worst apprehensions were not realized, for not one company suspended traffic, with which suspension, besides the depreciation of the bonds and the destruction of the share capital, the charter (according to our railroad statistics) is forfeited. The reason of this, no doubt, was the amalgamation of the government's with the companies' credit. On the other hand a great number of charters were annulled, lines planned were not begun, nay, even lines under construction, which enjoyed no guarantee, were stopped, and the existence of a great number of the younger companies was endangered. In so difficult a situation the governor had two tasks to solve: first, the support of the existing means of communication, which were in the interest of the state as well as of benefit to the public of the district immediately concerned; secondly, the completion of the railroad system. For there was not the least doubt that under conditions where consolidated companies applied in vain for capital, where guaranteed securities could find no buyers at approximately reasonable prices, where the government itself only succeeded in forming an association for buying Hungarian secondary bonds, where one company was obliged to withdraw its own securities sold to a German firm with a granted forfeit, where the German market sold out its great stock of Austro-Hungarian securities, nay, even special "actions committees" depressed our securities—we say, there was not the least doubt that under such conditions only the financial power of the state

could lend a helping hand. The effort to secure French capital in exchange for the lost German failed entirely. The disposition of the money market towards Austro-Hungarian railroad securities will be seen by the following statement, which shows the amount issued each year in round figures, not taking into account the government credits and the sales "underhand:"

Year.	Florins.	Year.	Florins
1868	78,300,000	1875	26,500,000
1869	148,600,000	1876	.....
1870	74,600,000	1877	9,000,000
1871	298,700,000	1878	16,700,000
1872	137,900,000	1879	15,700,000
1873	65,000,000	1880	7,300,000
1874	53,400,000		

Help could be rendered in different ways, and the government endeavored to encourage the spirit of enterprise by far ranging alleviations, while again in 1874 charters for nearly 300 kilometres of lines expired.

As to the support of the existing (especially younger) lines, which suffered from sins in their foundation, such as enormous capital, considerable and expensive floating debts, extremely unfavorable returns, while the guaranteed lines laid claim to their full subvention, and if this would not suffice, reduced the interest paid, the state could cure (*Saniren*—as the password was) by full subvention, or buying them up, for political and financial reasons, the more so, because the public opinion and the low prices on the exchange were then extremely favorable for the "Sanation" and the re-inauguration of the states railroad system. Another pass-word was "Fusion," *i. e.*, consolidating the smaller, poor companies with the rich neighboring companies, or, lastly, the companies were compelled to reduce their capital stock. When these questions, which were much discussed, publicly arose, some would find the solution in "fusion," but with every possible connivance for the capital invested; others also in fusion with "the preservation of their authority and independence secured by the amplification of their domain and by an entire state guarantee for every new construction."

Thus the great question with us was state or private railroads. Very soon we learned that temporary and even complete guarantee of interest, or granted loans, was illusory for the creation of new lines, because no contractors could be found.

In this sad state of things, the railroad companies petitioned for a new bill of taxation, with a memorandum to the Lower House, in which they called the existing taxes, especially the services required of the companies for the postal, military and revenue services oppressive; but the government only succeeded in raising the guarantee or covering the traffic expenses of some smaller companies, further with a single "fusion" among several that were planned, and the construction of some small lines known under the name of "urgency constructions."

With the introduction of the gold standard in Germany, in 1873, came another new and considerable difficulty for our railroads. The German bondholders demanded the payment of the coupons, reading in "Thaler Silver" (now 1 thaler = 3 marks gold), in gold; not less than 22 companies were affected by it, some of which refused point blank, some were uncertain, and one or two actually complied with the demand, while the subventions were paid in silver only. A circulation of more than 550 millions of florins of the bonds and a gold premium of 16 per cent. involved an addition charge on the Austrian railroads or on the state of much more than 4,000,000 florins a year. The Austrian exchequer, in answer to every claim for payments in gold, published with regard to this the following: "The Austrian government declares, standing on the ground of the charter-law, that there will never be paid more or anything else than silver florins, Austrian currency, and that consequences detrimental to the securities which were issued on the part of the Austrian companies, reading in silver currency, cannot follow because the standard of currency is changed in a neighboring country." The effect of this widespread coupon question was the arrest of the Austrian rolling stock in Germany, a notable interruption of the international traffic, the seizure of balances that were due our companies, the necessity of giving bail, differences between the administration of the railroads and the government, a countless number of law suits, which resulted in contradictory judgments, while the sentences and protestations passed by the Austrian courts were disregarded, etc., etc.

A final settlement was hoped from a new Austro-German treaty of commerce, but, in fact, it only checked the arrest of wagons to a certain degree. Thus the question has remained unsolved up to this time, and at present under the newest phase of the affair, the matter is aided by the government, which may, by small sacrifices, lead us to an understanding.

In 1875 the government ventured once more upon an extensive railroad programme, comprising about 530 kilometres of states railroad, with an expenditure of 76,500,000 florins, and further, the aid, fusion and rational grouping of certain companies, founded upon their real "commercial value" (one more catch-word), *i. e.*, a close restriction of the amount of the invested capital and precaution for sufficient equipment with the guaranteed lines. With this went hand in hand a reorganization of the railroad authorities, whose duty henceforth was to be the minute examination of the returns and operating expenses of the lines. The Lower House, however, in spite of the lamentable condition of the companies, the effort of the special committee that considered it, and in spite of the splendid defense of the Minister of Commerce and his assurance that the financial condition of the state would be no way affected, declined to indorse this scheme; the bill was not carried, consequently postponed. The government was obliged to restrict itself to settling the many differences which arose from the diverse interpretations of the guarantee law, and to the construction of some local roads, which were, after the narrow-gauge has been rejected, carried out with standard gauge and which are now worked by adjoining private companies. The discussion as to whether we have enough or need more through lines was a very long one; here the question was put, which are the lines to be constructed first? Granted that two countries are without a rail connection with the monarchy and that we lack so-called shortest routes; perhaps we are more in need of smaller commercial arteries that feed the bigger trunk lines. In reference to this, the House resolved as follows:

"That the government has, before carrying into execution such lines, *a*, to secure an adequate contribution for the expenses of the construction from the parties concerned, as committees, landlords, manufacturers, etc., in the form of low maximum prices for the necessary ground, or other compensation, for the supply of materials, or gratuitous cession of ground, renunciation of compensation, gratuitous supply of materials, etc., in proportion to the advantages arising from the construction of the road; *b*, to secure that lines be worked in a proper way by the neighboring railroad companies under contracts which will burden the treasury the least possible, both during and after the expiration of the contract."

In spite of experts, public opinion and the press, all of which were in favor of the state railroad system, which was either desired or carried out in many other countries, our representatives were in no haste about it, and our railroads were left to their destiny. The little aid granted to some of them had no perceptible effect upon the market. To raise money was a downright impossibility, and both distrust and the quantity of securities offered for sale increased in a frightful manner; a long chain of differences between the companies and the government induced the German bondholders to sell out their securities, which they bought in the belief that the state guaranteed 5 per cent. in any case. To quiet the market and foreign bondholders, the government intervened once more, declaring by government commissioners in the general assemblies, that a final settlement of the existing differences was intended. On Dec. 1, 1876, a boldly devised railroad programme was laid before the House by the government, aiming at a legal determination of the relations of the guaranteed railroads, which were suffering from operating deficiencies, to the state and further taking possession of such lines by the state, and the sanation of the railroads in the most forbearing manner by granting loans. A short time after the introduction of the bill the proposed fusion of two Bohemian roads was refused, and the ministry resolved to withdraw the bill, discouraged by such a failure. This determination was the occasion of a great many questions from different corporations, such as chambers of commerce, boards of exchange, etc., in favor of the bill; unluckily the attention of both our Houses was soon diverted from economical themes by an important domestic question and also by the oriental question, so that discussion did not begin until June, 1877, after which the bill was amended by the upper House and sanctioned Dec. 14, 1877. Alas! much valuable time has been lost over it. The integral parts of the statute are the following: § 1. The government was empowered to advance money in bank-bills, Austrian currency, to such railroads as enjoyed the states guarantee, in form of net earnings, in order to meet the operating expenses. § 2. The government was empowered to work directly or to lease railroads to which money was advanced (to cover the operating expenses). This right would be forfeited when the company did not claim such loans for three successive years. * * * § 4. The government was empowered to work such railroads as claimed *more* than one-half of the guaranteed net earnings during the five successive years. This right of the government would be forfeited when the company claimed *less* than one-half of the guaranteed net earnings during three successive years.

Seven Austrian companies came under the provisions of this law, and the government applied it for the first time to the Rudolph Railroad, Jan. 1, 1880; later to a Galician road, both of which are at present worked by the state. Not taking this favorable turn in the history of our railroads into account, a great change for the better took place in 1877. During the Russo-Turkish war, when we enjoyed an excellent crop, an abnormal shifting of the natural channels of the traffic was the consequence of the blockade of the ports of the Black Sea. The enormous quantity of freight carried and the favorable returns put three of our companies into position to refund sums, though comparatively small, to the treasury. This profitable condition lasted for three months more in 1878, up to the treaty of peace, when our western export was checked by the competition of Russian and American grain. Again the money market was affected, though temporarily, by the failure of one company to pay full interest; but the government kept up the confidence by defraying the past as well as future traffic deficiencies. A credit of 500,000 florins sufficed to clear off the differences from 1872 to 1878, and about 300,000 florins more for every following year coming. Some companies succeed in helping themselves. The fructifying effect of the powerful assistance of the government here and on the economical organism altogether was clearly shown in prices on the Stock Exchange.

In 1878 the state acquired the lines of the Southwestern Railroad, in Lower Austria, where the government had long been the greatest shareholders; in 1879, one company abandoned the working of a branch line, only 10.4 kilometres long.

By the newly inaugurated railroad and tariff policy in Germany, the question of the Arlberg Railroad, destined to convey our grain to the West, independent of the German roads, and which had already been proposed and postponed several times, became a burning one. Our legislature was at first shocked by the enormous sum asked for (35,600,000 florins; the road has a tunnel 10.27 kilometres long [6½ miles]) and demanded certain compensations on the part of Hungary, to which the line is of the greatest importance. The wearisome negotiations were without an evident effect, and the construction of the Arlberg line was determined for economical, political and strategical reasons.

With this we arrive at the recent period of our railroad history, and we have only to add that, provided the assent of the Parliament is obtained, the state railroad system will be inaugurated on a large scale during the current year; it is to be begun with the incorporation of the great Western line (the Empress Elizabeth Railroad).

Not till then, when long and consolidated lines are forced together with smaller ones, the management concentrated a rational and systematic tariff policy, and a controlling power created, can the treasury be relieved of its burden and the great aim reached. To throw some light upon the proceedings in the other (Hungarian) half of the monarchy I will only call attention to the most striking facts. Hungary had, with regard to railroads, far more to perform than Austria, because that wide, sparsely settled country, showed many gaps in her railroad system. A railroad programme, devised in 1872, comprising about 2,200 kilometres [3,540 miles], at the expense of 450,000,000 florins, was not carried into execution, in spite of a partial government guarantee, and a *still* favorable money market, because, by this plan, a great number of competing lines had been created. Hungary was moreover sorely tried by certain contractors, whose enormous claims on the state amounted to more than 50,000,000 florins; *a part* of which has been reduced to less than the half, and the rest not recognized at all. There were also great expenses to meet for necessary additional investments, viz.: *Stock of* materials, equipment, working capital, interest on a considerable floating debt, which grew up in consequence of unfavorable returns. (In 1874 one company stopped all payments). There was very much at stake, and the state helped, according to its own ability to save the companies from utter ruin. A credit, voted for that purpose, the interest and amortization of which was not to exceed 700,000 florins a year, sufficed to yield the means to several companies to improve their financial position; these loans amounted to nearly 11,000,000 florins in the course of some years. Hungary sooner than Austria directed her attention at the same time to local roads, which proved highly successful, and to the embodying of important lines in the state railroad system, so that Hungary is at present in the possession of large controlling roads. Hungary follows a systematically traced out policy, which policy may be justified, when viewed from the national standpoint, but we certainly could not call it so in reference to the Austrian half of the monarchy The only aim is to get control of the whole Oriental traffic. Hence the construction of new expensive lines, and many measures taken of recent years, find their explanation, to argue which point would bring us too far into details which would suppose an exact geographical and other knowledge of this country. To complete this little essay, sketched only in general lines, I have only to present further tabular statements, showing the further development of our railroads up to the present year.

The number of kilometres of railroad opened for traffic in successive years has been as follows:

	Austria.	Hungary.	Together
1865	86.8	213.7	300.5
1866	266.3	.....	266.3
1867	180.1	123.2	303.3
1868	460.2	378.6	838.8
1869	731.1	133.3	864.4
1870	802.7	739.8	1,602.5
1871	1,207.6	921.3	2,128.9
1872	1,154.4	974.7	2,129.1
1873	835.2	868.7	1,703.9
1874	332.9	171.9	504.4
1875	674.3	2.8	677.1
1876	443.6	284.2	727.8
1877	447.9	73.5	551.4
1878	47.1	277.7	264.8
1879	81.2	59.5	140.7
1880	32.7	20.0	52.7

Our roads grouped in states and private lines were as follows Jan. 1, 1880, in kilometres:

		State railroads.	Private Railroads.	
			Guaranteed.	Not guaranteed.
Common Austro-Hungarian roads*		.....	5,084.8	233.5
Austrian	State roads	953.9	.....	.....
	Private roads	.....	4,942.2	2,819.2
Hungary	State roads	1,966.7†	.....	.....
	Private roads	.....	2,165.7	237.2
Total		2,920.6	12,198.7	3,290.0

* Lying partly in Austrian and partly in Hungarian territory.
† Increased during the year 1880 up to about 2,500 kilom.

This statement shows a total number of 18,404.2 kilometres [11,731 miles] in operation for public service; add to it the 53 kilometres opened in 1880, besides the local narrow-gauge lines, and we obtain a total in round figures of 19,000 kilometres [11,800 miles] of railroad in operation in Austria-Hungary.

The total investments, stock, funded and floating debt, in these railroads exceed 3,060,000,000 florins [$1,500,000,000 = $127,100 per mile].

P. F. KUPKA.

VIENNA, January, 1881.

Chicago-Southwestern Passenger Traffic.

The negotiations for the settlement of passenger traffic between Chicago and St. Louis, and between Chicago and St. Louis and Missouri River points have so far proved fruitless. This is the business which was disturbed by the contest between the Wabash and the Chicago & Alton roads over the Chicago and St. Louis business. The several roads some time ago ceased contending for the traffic by cut rates, but the Chicago & Alton had sold a large number of unlimited tickets between St. Louis and Kansas City, and the Wabash probably a still larger number between Chicago and St. Louis at a little more than half the regular rates. The ticket brokers offices being full of these tickets, which they can make a profit on at much less than the regular rates, when the companies were ready to cease their contention, they could not sell tickets at prices much more than those at which these unlimited tickets were sold without throwing all the business into the hands of the brokers; and then the lines which did not sell unlimited tickets at reduced rates during the war would get none of the business.

In the latter part of January a meeting of the general managers of the roads concerned was held in Chicago to devise means to restore rates and maintain them in future. At this meeting Messrs. A. A. Talmage, of the Missouri Pacific J. B. Carson, of the Hannibal & St. Joseph, and Joseph F. Tacker, of the Illinois Central, were appointed a committee to report a plan to a future meeting, which was held in Chicago Tuesday of last week. This committee submitted the following:

In accordance with the instructions provided in the resolution, your Committee met at the office of the Missouri Pacific Railway Company in St. Louis at 10 o'clock a. m., Wednesday, Feb. 9, 1881. Objections being raised by one of the parties in interest to the opening of the envelope containing its report of unlimited tickets sold, unless under certain restrictions, which your Committee could not assent to, your Committee therefore could not act with the intelligence that they had hoped to, but beg to submit the following as the result of their deliberations:

First—That from and after midnight of Feb. 28 all rates between Chicago and East St. Louis and St. Louis, Chicago and Missouri River points, St. Louis or East St. Louis and Missouri River points, and between all points that in any way directly or indirectly can or do interfere with such rates under control of any line interested, be restored to full card or tariff rates; that until such time the present rates be in force.

Second—That the difference between what the cut-rate tickets as per statements made (which statements are part of this report) were sold at and full tariff, or what they were actually redeemed at, shall be settled by the line issuing such unlimited or cut-rate ticket, first paying one-third of such difference, the other two-thirds to be divided among the lines interested in proportion to the percentages recommended by this committee in this report, it being understood that the lines between Chicago and East St. Louis and St. Louis, the lines between St. Louis, East St. Louis, and Missouri River points shall take care of only such cut-rate tickets as lay in their channel.

Third—That after midnight of Feb. 28 each line shall redeem its outstanding unlimited cut-rate tickets as per statements by whoever presented at full card rates, no matter to whom sold or at what price, and the loss be divided in accordance with article second.

Fourth—Only such tickets as shall be used on trains or redeemed after Feb. 15 shall be taken into consideration in the settlements, and in redeeming such tickets it shall be understood that they shall be redeemed at the least possible cost, and accounted for by each line redeeming them at the actual prices paid, and such statements shall be made by the general passenger agents of each line under oath to the Commissioner.

Fifth—That from and after midnight of Feb. 28 all through passenger business to or from any junction, terminal, or Mississippi River point (west of the east state line of Illinois) of any of the lines interested in the following pools to, from, or beyond any Missouri River point, shall be apportioned as follows:

Chicago group, 56 per cent.; Hannibal and St. Joe Railroad, 7½ per cent.; St. Louis groups, 36½ per cent. The Hannibal & St. Joe Railroad will be allowed their 7½ per cent. at tariff rates current between Quincy and Missouri River points.

Sixth—All passenger business to or from Chicago and Missouri River points or points beyond, and the 56 per cent. of the through business as above allowed to the Chicago group, shall be pooled in gross and divided as follows: Chicago, Burlington & Quincy, 33⅓ per cent; Chicago & Alton, 25 per cent; Chicago, Rock Island & Pacific, 24 per cent.; Wabash, St. Louis & Pacific, 17⅔ per cent.

Seventh—All passenger business between Chicago and East St. Louis and St. Louis, or points beyond either Chicago or St. Louis or East St. Louis, or to or from East St. Louis, St. Louis, or beyond, and points beyond the east state line of Illinois, shall be pooled in gross and divided as follows: Chicago & Alton, 42 per cent.; Wabash, St. Louis & Pacific, 34 per cent.; Illinois Central, 24 per cent.

Eighth—All passenger business to or from St. Louis or East St. Louis and Missouri River points, or points beyond, and the 36½ per cent. of the through business allowed to the St. Louis group, shall be pooled in gross and divided as follows: Missouri Pacific, 47 per cent.; Wabash, St. Louis & Pacific, 32 per cent.; Chicago & Alton, 21 per cent.

Ninth—That all passenger business passing through any junction, terminal or Mississippi River point west of the east state line of Illinois in competition with either of these pools, and going over any portion of any line interested in them, where the proportion accruing to the line carrying the business shall equal or exceed the tariff rate from Chicago or St. Louis, the Chicago or St. Louis proportions shall be put in the pools of such tariff. If the proportion accruing to the line is less, the whole amount received by the company carrying the business shall be put into the pool.

Tenth—That no commissions shall be paid from the 27th of February, on any business between Chicago and East St. Louis or St. Louis; between Chicago and Missouri River points; or between East St. Louis or St. Louis and Missouri River points; or between any interior junction or river points west of the east state line of Illinois and any of these points; this to apply to all through and local business, it being the intention that no commissions shall be paid, directly or indirectly, on business that may pass between, through or beyond any of the points named in this clause to, through or beyond any of the other points, so far as the whole scope of business in these pools is concerned.

Eleventh—That the Committee recommend urgently the pooling of the local passenger business between each interior junction, terminal, and Mississippi River points, on all of the lines interested west of the east state line of the Illinois and Missouri River points and St. Louis or East St. Louis, within those months, such pools to date from Feb. 27, in order to strengthen the larger pools herewith named.

Twelfth—That these pools shall continue two years unchangeable.

Thirteenth—There shall be an Executive Committee of three, to be chosen by ballot by the majority, and your Committee recommend that they be selected—one to represent the roads between Chicago and Missouri River points, one to represent the roads between St. Louis and Missouri River points, and one to represent the roads between Chicago and St. Louis, whose duty it shall be to call all meetings of managers, to advise with the Commissioner in all matters pertaining to rates and the general business connected with their pools, audit all bills, and have general charge of the business. A majority action of such Committee to govern.

Fourteenth—That a Commissioner shall be appointed by a two-thirds vote of the lines in interest, each line to have one vote, and each line to be privileged to nominate a candidate for the commissionership to the meeting. Said commissioner's duty shall be, under the direction of the Executive Committee, to carry out all the details connected with the pools herewith named, publish and promulgate rates, and have general charge of all matters of business pertaining to such pools. And he shall be empowered to call for any reports, books, papers and any and all information that may in his judgment seem necessary to accomplish the purpose of these agreements.

Fifteenth—That at the expiration of the two years, by notice in writing from either party interested of their wish that the percentages of either group shall be changed, the Executive Committee shall call a meeting of the managers, and if such meeting cannot agree each line interested in such change of percentage shall have the right to name an arbitrator, and they combined to name such other arbitrators as will make the next odd number, and the majority decision of such arbitrators shall be final for one year; and any changes of the percentages allowed each group shall only be made in such way, and such percentages shall remain in force one year.

Sixteenth—The Committee recommend that the pool be made for five years, to be changed only as above detailed.

Seventeenth—That the headquarters of the Commissioner shall be at St. Louis.

Eighteenth—In case of any readjustment of the percentages, no account of any cut rate tickets shall be taken into consideration in fixing future percentages to govern these pools.

There were present at the meeting to consider this report: A. A. Talmage and France Chandler, Missouri Pacific; J. F. How, H. C. Townsend, and George H. Daniels, Wabash; James Charlton, Alton; T. J. Potter and James R. Wood, Chicago, Burlington & Quincy; R. R. Cable and E. St. John, Rock Island; J. B. Carson, F. E. Morse, and L. H. Hooper, Hannibal & St. Joe; J. F. Tucker, Illinois Central.

Mr. J. B. Carson was elected Chairman and George H. Daniels Secretary.

The meeting considered the report section by section. The first and second sections were approved by a unanimous vote, but the Wabash voted against the third section, the Wabash and the Chicago & Alton against the fourth, these and the Rock Island against the fifth and sixth. As unanimity is required, the meeting adjourned without coming to any conclusion.

The Wabash's chief objection to the plan is said to have been on account of the plan for redeeming unlimited tickets, and the failure to award it any share of the business by way of Hannibal, and the Chicago & Alton because it felt entitled to a larger proportion of both the Chicago-St. Louis and Chicago-Kansas City travel.

The Baltimore & Ohio in Delaware.

A correspondent of the Baltimore *Gazette*, writing from Wilmington under date of Feb. 17, gives the following statement as to the fight in the Delaware Legislature over the proposed new line between Philadelphia and Baltimore:

The absorbing topic throughout the state is the fight being made by the Baltimore & Ohio Railroad Company, through Col. McComb, of this city, to get a charter to enable them to build a new road from Baltimore to Philadelphia. Col. McComb is the wealthiest man in the state, and obtained a national fame in connection with the exposé of the Crédit Mobilier scandal, the facts having leaked out through a law suit brought by him to get possession of some of the Crédit Mobilier stock, to which he had subscribed. He now holds a controlling interest in the Delaware Western Railroad, which, in case the charter is granted, is to be merged into the Baltimore & Ohio road.

HOW THE FIGHT BEGAN.

A special correspondent, writing from Dover, gives the following interesting account of the contest now going on at that place: The Delaware Western road, as it now exists, runs from Wilmington up in a tortuous northwestern line to Landenberg, in Chester County. About eighteen months ago this road, which had never attracted much attention before, suddenly became an object of interest. A race was inaugurated for the control of its stock. The contestants were Col. H. S. McComb, of Wilmington, and Mr. Carter, of Philadelphia. The competition was short but interesting, especially to the holders of the stock, which mounted in a few days from $15 to over $25 per share. Between them Mr. McComb and Mr. Carter bought up the entire stock of the road, with the exception of a very few shares, but the former came out of the race with something over half the whole amount.

THE MARYLAND LEGISLATURE.

What Col. McComb proposed to do with his railroad was then the question that agitated the people of Wilmington. The first intimation of what he might do with it came about the closing days of the 1880 session of the Maryland Legislature. A bill to incorporate a company for building a new line between Baltimore and Philadelphia was introduced and passed by one house, but opposed and withdrawn to avoid its being pocketed in the other. The corporators named in the bill were composed of Baltimore & Ohio, with a small sprinkling of Delaware Western men, and special franchises were sought, not to be obtained under the general railroad law of Maryland. Now the Delaware Western Company has a roving charter under which it can build branches from Wilmington extending eight miles in any direction; but such branches will not quite reach the Pennsylvania line on the northeast nor the Maryland line on the southwest. To meet this difficulty is

THE OBJECT OF THE LEGISLATION

asked for in the bill now pending before the Delaware Legislature. Before the trial was made, the people of New Castle County hardly dreamed that there would be any difficulty in securing such legislation from a Democratic Assembly. This confidence was the outgrowth of various local movements, too lengthy and uninteresting to be recapitulated. It was generally understood that the Philadelphia, Wilmington & Baltimore Company had played for the control of state legislation, and having lost could not expect any worse from representatives of Delaware Democracy nor from that faction of the Republican party of Delaware to which the New Castle County members belong. But the Delaware Western men reckoned without their host. Sussex is likely to furnish the remaining four or five needful votes, as soon as good-natured, but rather slow, Peter Robinson gets enough light to show him "what good this railroad will do Indian River hundred." The key that is likely to unlock all the combinations the Philadelphia, Wilmington & Baltimore Railroad Company can form to kill this bill in the House is that 15,000 voters of New Castle and four or five thousand of the 7,000 of Sussex are anxious for a competing line and demand that the present opportunity be taken to secure it. Party is nowhere now—railroad is the topic—and if the bill is defeated the Democrat or Republican representatives who vote against it can never hope for official preferment while New Castle holds the cards that can make or mar his game.

THE OPPONENTS OF THE BILL

succeeded in gaining the co-operation of such Democrats as John F. Saulsbury, the late Secretary of the Democratic State Central Committee, Secretary of State Wolcott, and others who, since the recent campaign, have not hesitated to denounce the P., W. & B. as having contributed money to the Republican campaign fund to defeat Congressman Martin and Senator Bayard, and they succeeded in staving off a vote upon the bill in the Senate until Thursday last, when, after having been doctored with several amendments, it went through by a vote of seven to two, one more than the requisite two-thirds. As it stands, the bill prescribes the line of the road as follows: It shall enter the state from Maryland in the neighborhood of Newark, and passing within half a mile of the north of that town run in a northeasterly direction by way of Wilmington to the Pennsylvania line, making it nearly parallel with the Philadelphia, Wilmington & Baltimore road and running a little to the westward of that road. The bill has now to run the gauntlet of the House, and that under the eye of a hostile speaker, which was not the case in the Senate. It will be safe to say that it will take another month for it to do this and determined effort will be made to swamp it with amendments the moment it seems likely to go through. The New Castle members may be set down as solid for it. There are two of them on the fence, but their constituents will not let them stay there long. From Kent more opposition than favor is to be expected, because Kent has been the camping-ground of the opposition from the start. Two or three of the Kent members will, however, fall into line when they fully comprehend the merits of the bill and the number of voters behind it.

THE SITUATION ON WEDNESDAY.

The House Committee on Corporation held a long session last night devoted to consideration of the bill. Counsel for the bill and for the Philadelphia, Wilmington & Baltimore road were present, and after a discussion, which lasted long after midnight, an amendment, requiring the road to be commenced in one year and completed in three, was adopted. An amendment was rejected which required that no greater charge be made for freight by this company, when the road is built, than shall at that time be charged by any other line between the competing points.

Objections to the Proposed Railroad Along the Erie Canal.

State Engineer Horatio Seymour, Jr., has given the Canal Committee of the New York Senate the following statement of his objections to the proposed berme-bank railroad. The objections are suggested in response to the argument of Hon. John B. Jervis, of Rome, favoring the project.

There is no doubt as to the power of a locomotive to draw boats; but the question is whether it is an economical method of towing on our canals, and whether it would obstruct or hinder boats propelled in any other way? The success of our canals depends upon their being so managed that boats will have a safe and speedy passage. Anything that threatens or delays navigation increases the cost of transportation. At the rate ordinary canal boats move, carrying 240 tons, there has been no power yet devised which is as cheap as horses towing. In order to compete with the horse boats the locomotives must transport a greater load and move a higher rate of speed; but so far as experience goes it is impossible to do this with any economy. The experiment of towing with a locomotive on the Champlain canal, spoken of by the advocates of this bill, was no test of the economy or practicability of the plan as applied to the Erie canal. A locomotive was used to tow a single boat a short distance through a perfectly straight piece of canal. No obstacles were met that a fleet would encounter in being towed from Buffalo to Albany. Experiments made on the Erie canal by the Cable Towing Company in towing a fleet, show that for a trip from Buffalo to New York and return the time taken was greater by from five to fifteen days than by the ordinary method of towing by horses.

The projectors of the berme bank railroad plan claim that the delay was caused by the boats not being closely coupled, and desire to prove this by an experiment made on the Susquehanna Canal. This test on the Susquehanna Canal of towing six coupled boats by horses is no proof that towing the same number of boats on the Erie Canal by a locomotive will be a success. The boats on the Susquehanna Canal were 82 ft. long, 15 ft. wide, and 5 ft. draught, with sharp bow and stern. They carried 110 tons. The boats on the Erie Canal are 98 ft. long, 17½ ft. wide, and draw 6 ft. They carry 240 tons and their bows and sterns are almost square. The locks on the Susquehanna Canal are long enough to take in two boats without uncoupling. Our locks can pass but a single boat. An experiment, therefore, when the conditions are so different from those on the Erie Canal is of little value.

NO ROOM FOR A RAILWAY.

The Erie Canal is made, with the exception of a few miles, along the side hill, an embankment having been thrown up to form the towing path, the water conforming to the contour of the hills on the berme side, except where an embankment or aqueduct is necessary to carry the canal across a ravine or valley. In many places the slope of the hills is so steep that it is with difficulty that slides are prevented. If these slopes are made still more steep, as they would have to be if a railroad track was placed along them, it would need thousands of dollars every year to protect the canals from filling up. In places it has been carried through rock cutting, a perpendicular face having been left on the berme side. The track of the railroad would in such places have to be within the limits of the water-way of the canal. This would check the flow of the water, delay lockages and obstruct the passage of the boats. It is conveyed across rivers and streams by aqueducts. One of these is over a thousand feet long. The piers upon which these aqueducts stand are only of sufficient width to carry the wooden trunk containing the canal. It is necessary on a portion of the canal to use both banks for towing purposes. The berme side of the Erie Canal in every city and village from Buffalo to Albany is used as a dock, to which boats tie up and upon

which they discharge their cargoes. A railroad would prevent this. In many instances buildings have been constructed within less than six feet of the edge of the water. To such an extent has this been done that a committee of the Legislature appointed to investigate the encroachments on the state property reported that it was inexpedient to require their removal, because it would destroy a large amount of valuable property which contributed to the commerce of the canals. This bill would put into the hands of a corporation to do as it saw fit with property of citizens which the state considered it unwise and unjust to disturb.

No more than two boats have ever been successfully moved in train on the Erie Canal. But in order to make this plan a success they must move enough faster than horse boats to make up for the additional delay at the locks. There are 72 locks between Buffalo and Albany. At all of them the tow must wait until the last boat is through. Allowing ten minutes for a single boat if the lock is ready, and twice that time if a boat is locking the other way, the least detention of six boats at a lock would be an hour and the greatest two hours. Taking an hour and a half as the average time it would require 108 hours, or 4½ days, to pass the 72 locks. The distance from Buffalo to Albany is about 350 miles. The speed at which Mr. Jervis expects the train to move is 2½ miles an hour. The time required, therefore, would be 140 hours. To this must be added the 104 hours consumed in locking, making the total time necessary for a tow of six to move from Buffalo to Albany 244 hours, or ten days and four hours. This is about the average time for horse boats. This is assuming that the delay caused by locking through six boats in a fleet is no more than six times that caused by locking one boat, which is not the case, for the reason that an accumulation of boats on either side of a lock always creates a delay. They block up the canal by drifting along the channel, time being required to move them in line before they can enter the locks. By lying across the channel they check the flow of the water to such an extent that boats frequently get aground, and the locking must cease until the level is raised again. These difficulties would be increased by towing six boats together.

Horse boats have difficulty in passing a tow. They are either drawn along with the current or thrown against the bank by the swell of the train. The commerce of the state has suffered from the delay caused to horse boats and steamers by the cable, and it can not afford to allow an experiment that bids fair to make like trouble.

THE SCRAP HEAP.

Swinging the Floor Trusses of the East River Bridge.

The steel suspenders which for months have been dangling idly on each side of the Brooklyn tower are now being utilized, and passengers by the Fulton ferry-boats once more begin to believe that the great bridge will be completed before the millenium. Three of the steel floor beams have been swung into position—a fact which has created more comment among ferry passengers than any other topic for six months past. This work was begun on Thursday, the same day, by the way, that the last block of granite was lifted into its place and the Brooklyn approach to the bridge, so far as masonry is concerned, was pronounced finished. Each floor beam is in two sections about 40 ft. in length, which, welded together, at their ends, form the extreme width of the bridge flooring—85 ft. Each section weighs two tons, and notwithstanding the immense weight, the two are easily hoisted to the tower roadway, 120 ft. above the ground, by means of an endless wire cable. In appearance the sections resemble the truss work on which are laid the tracks of the elevated railroad. The upper and lower chords or beams of each section are strongly welded together by means of diagonal braces.

The method of hanging these weighty sections from the suspenders is peculiar. At the ends of the latter are large steel plates, which, from their height above the deck of a ferry-boat, are dwarfed to the size of a button whose two holes are no larger than pin points. Screwed into each of these holes is a long steel bar which passes downward through two plates, one on the top and the other on the bottom of the section, and terminates in a huge nut. The advantages of this method are that the sections may be elevated or depressed to counteract any unexpected stretching or tightening of the suspenders, two of which will be required to support each section. Three floor beams will be hung on the water span, and on Monday the work of laying an equal number on each side of the New York tower will be begun. Col. Martin and his workmen will push this work as fast as the Edgemoor Steel Co. can furnish the material. The company, Col. Martin says, has the steel at its shops and its complicated machinery now so perfect that within a few weeks it can fully supply the parts necessary to complete the truss-work. There are to be six of these trusses running lengthwise of the bridge. They are, in fact, the steel division lines between the road-ways, the tracks for steam cars and the foot-paths for pedestrians. The top and bottom chords of these trusses will be braced diagonally with broad strips of the best steel. The two roadways will be on the outer sides of the bridge, the foot-paths exactly in the centre, with a railroad track on either side of it. Two courses of timber will be used for the flooring. The lower, which is intended to be permanent, will be of yellow pine 4½ inches in thickness, and the material is now being soaked in creosote to toughen it against the action of the weather. The upper flooring, which will be replaced as fast as it wears away, will be of white oak 2½ inches in thickness. Col. Martin has now about 150 men employed on the bridge, nearly all of whom have been at work on the structure since its foundations were laid. When the Edgemoor Company begins to send along supplies regularly he can push the work of laying the floor beams with great rapidity. —*New York Times, Feb.* 19.

More Lost Cars.

Conductor Baxter and George Baker told a good story last week in the "Splints from the Rail;" but I can tell you one fully equal to it, "if not more so."

One cold winter's night in December, 1856, I left Port Jervis bound for Bergen with a train of cattle, hogs, sheep, and so forth, loaded in old Greene, Erie and Canandaigua open stock cars, and no brakes but the boss lever on the end and the one on my four-wheeled jumper in the rear of the train, which was just large enough for old Jake Bates from Ithaca, and Preying Redman, from Illinois, with the greaser and their prod-poles to get into. On arriving at the Y for water (which is now called Sterling Junction) my oilman, old Jim Welsh (better known as "Small Loss"), on an examination of the train, discovered that the forward truck was gone from one of the old Canandaigua cars, and which was held up by the coupling (better iron then than now days). Jimmie came back to the caboose and said: "Bosh, the —— Canadaga care has losht its for'd thruck, and I giss its gone to the a divil, but small loss. The care is on the thrack nd old Jake Bates is a-shlape."

Old Jake turned his yoke with a snore and cried, "Get out of here; you are dreaming."

"Small Loss" replied, "And if the couplin' had broke, you'd be dreaming with the *divil*, and ox-tail soup would be chape, as well as fresh hams and mutton chops."

Where the truck was no one knew, but fortunately I had met no other train and left my head brakeman at the Y to stop the first train west, get on the engine and run slow, thinking it might be over on the westward bound track. The first train that came along was Bill Hammond's (and a first-class runner was he) with, I think, old 168, a Wilmuth engine. He stopped, picked up my flag and found the truck over on the west bound track about a mile east of Southfield station, running a distance of six miles and running it double that number of minutes, although 18 miles was the limit. The boys used to steal time on the road then with the operators. (Of course they wouldn't do it now). Oh, no!

We left the Y and ran on to Suffern, nine miles, run with one truck, and left the car. I had to leave two cars with only three trucks.

At the last convention of the Order of Railway Conductors, held in St. Louis, a resolution was read, making any member of the insurance entitled to the benefit through the loss of *one* leg, the same as if dead. The delegate from Scranton addressed the chair (Brother Joseph Kimball) and asked: "Suppose a brother loses *both* legs, what then?" The chair replied: "If he loses both he must certainly *lose one*, mustn't he?" The delegate: "O. I. C." So, if we had lost two trucks we probably wouldn't have been any better off than the man who loses two legs.

Another instance, as early as 1851 or '52, occurs to me. Ben Quick left Deposit with a train of flour, and one of the cars mounted the frog west of Middaughs, ran as far as the water-tank, left the train, ran through the tank clear of the train and the rear part followed the head end, both stopped, were coupled up and on to Port they went. The way-bill clerk took the number of the cars in the train on its arrival, and couldn't find car 761 as the way-bill called for, so he sent up to Ben's house to know what he had done with it. Ben declared that he started with 761 in his train from Deposit, as he took the numbers there and made up his own train, and if it wasn't there some one must have stole it out on the way. Next morning Middaughs called up Port Jervis, and reported a car of flour into water-tank, tank knocked to pieces, and price of flour cheap. Beat this if you can.—*Ex-Conductor John Morford, in Port Jervis Gazette.*

Incidents of Railroad Life in Mexico.

At one of the meetings of the Mexican Railway in London (in June, 1879), the chairman in his speech said:

"Now there is one other occurrence which I cannot pass by, and that is one of which we ourselves were the victims. In the broad daylight, at one o'clock in the afternoon, one of our officers was on his way from the station to the office in the town with some silver in his possession—about $6,000 or $7,000—and he was waylaid in the high street and the vehicle which he was in stopped by half a dozen horsemen, who fired off their pistols, or whatever they had. I do not know that they did any bodily injury with them, but they possessed themselves of the dollars. Now you might just as well imagine a clerk from the London & Northwestern coming down into the city being waylaid in Holborn. It was in the middle of the day, with probably 200 or 300 people in sight. No notice was taken of it by those in the street, and it was regarded by those who saw it as one of the pleasant incidents of Mexican existence."

An Engineer's Epitaph.

A correspondent sends us *à propos* of our notice of Mr. Reynold's "Engine-driving Life," the following lines, forming part of an inscription on a tombstone in Bromsgrove churchyard, to the memory of Thomas Scaife, a driver, who was killed by the explosion of his engine:—

"My engine now is cold and still,
No water does my boiler fill;
My coke affords its flame no more,
My days of usefulness are o'er.
My wheels deny their noted speed,
No more my guiding hands they need;
My whistle, too, has lost its tone,
Its shrill and thrilling sounds are gone.
My valves are now thrown open wide,
My flanges all refuse to guide.
My clacks also, though once so strong,
Refuse to aid the busy throng.
No more I feel each urging breath,
My steam is all condensed in death,
Life's railways o'er, each station's past,
In death I'm stopped and rest at last."

This inscription is also to be found at Wickham, near Gateshead, where it commemorates a driver who met his death during the execution of his duty. It is stated in both cases that the lines were composed by "an unknown friend"—*London Engineer.*

A Hog in the Car.

'Twas on a railroad car. There was a tired-looking lady with a bright-looking child, and the usual complement of passengers, among whom, of course, was the man who snored and kept the remainder of the passengers in misery. The bright little child had asked the tired-looking mother 794 questions, and was just settling down to silence, to the great delight of the mother, when the man who snored, turned on steam and gave a prolonged "Snee—e— Haw—w!"

"Ma!" shouted the bright little child.

"What is it, dear?" queried the tired but fond parent.

"There's a hog in this car," continued the innocent. "I heard him grunt."

And then a roar went up from the passengers who didn't snore, and the passenger who did snore woke up and rubbed his eyes, and when informed of the status of affairs left the car in the greatest indignation, muttering that "children should be seen and not heard."

The passengers who didn't snore made up a purse for the infant that had vanquished the man who did snore.—*Keokuk (Ia.) Gate City.*

LOCOMOTIVE RETURNS, SEPTEMBER, 1880.

Master Mechanics of all American railroads are invited to send us their monthly returns for this table.

Name of Road.	Number of miles operated	Number of locomotives in service	Mileage. Total	Mileage. Average per engine	Miles Run to. Ton of coal	Miles Run to. Cord of wood	Miles Run to. Pint of oil	Average No. of freight cars hauled	Cost per freight car per mile, cents	Cost per Mile in Cents for. Repairs	Fuel	Stores	Miscellaneous	Engineers, firemen and wipers	Total	Average Cost of. Coal, per ton	Wood, per cord
																$	$
Allegheny Valley, River Division*	139	35	81,357	2,333	40.28	.....	23.12	23.20	0.616	4.81	3.04	0.49	...	6.33	14.67	.....	.....
Low Grade Div*	120	20	40,665	2,030	29.20	.....	17.45	22.50	0.860	5.16	3.55	0.67	...	6.52	15.90	.....	.....
Central Pacific, Western Div.†	200	23	72,129	2,774	42.45	.....	19.03	.....	.....	6.63	16.96	0.48	0.41	7.31	31.19	7.20	4.80
Northern & San Pablo Divs.†	104	29	83,594	2,880	34.34	.....	2 10	.....	.....	2.38	20.97	0.44	0.41	7.46	31.66	7.20	4.80
Visalia Div.†	157	11	32,732	2,976	36.75	.....	18.41	.....	.....	2.51	19.60	0.46	0.09	6.34	29.00	7.20	4.80
Tulare Div.†	170	12	27,479	2,291	36.51	.....	16.14	.....	.....	5.43	19.72	0.56	0.35	9.26	35.32	7.20	4.80
Los Angeles, San Diego, Yuma & Wilmington Divs.†	709	54	150,798*	2,793	50.99	.....	17.50	.....	.....	3.10	14.12	0.50	0.28	7.21	25.21	7.20	4.80
California Pacific Div.†	179	12	35,421	2,952	34.47	.....	22.78	.....	.....	7.58	20.80	0.43	0.54	6.77	36.21	7.20	4.80
Stockton & Copperopolis†	49	5	8,037	1,727	46.95	58.46	14.60	.....	.....	5.49	10.80	0.61	0.42	5.85	24.17	7.20	4.80
Sacramento Div.†	140	10	107,868	2,697	.....	36.87	20.18	.....	.....	2.70	17.80	0.44	0.33	8.44	29.77	.....	4.80
Oregon Div.†	151	8	29,844	3,731	.....	38.86	27.38	.....	.....	1.13	12.35	0.33	0.06	6.93	20.80	.....	4.80
Truckee Div.†	205	26	70,142	2,698	33.39	54.40	19.81	.....	.....	5.26	20.09	0.45	0.46	8.11	34.47	7.20	4.80
Humboldt Div.†	200	20	54,011	2,701	39.65	.....	21.94	.....	.....	6 68	18.16	0.42	0.36	7.63	33.25	7.20	4.80
Salt Lake Div.†	219	26	82,565	3,176	33.29	.....	18.76	.....	.....	4.76	21 62	0.49	0.32	7.28	34.37	7.20	4.80
Chicago & Eastern Ill., Main Line‡	153	28	96,598	3,450	36.00	.....	16.00	43.00	.....	4.20	3.70	0.40	.....	5.40	13.70	.....	.....
Terre Haute Div.‡	72	12	26,590	2,216	42.00	.....	19.00	32.00	.....	1.10	3.20	0.30	.....	4.60	9.20	.....	.....
Clevel., Col. Cin. & Ind.	472	...	465,420	.....	38.16	.....	29.18	.....	.....	2.63	6.25	0.57	.....	6.51	15.96	.....	.....
Cleveland & Pittsburgh*	225	84	188,955	2,249	44.85	.....	18.81	18.50	0.831	3.64	3.27	0.46	3.14	6.59	17.01	1.42	2.70
Cleveland, Tus. Valley & Wheeling	160	19	61,058	3,214	31.98	.....	17.05	.....	.....	5.48	2.48	0.52	.....	6.43	14.91	0.72	2.00
Dela., Lacka. & Western, Bloomsburg Div.§	80	23	69,520	3,023	.....	.....	26.26	.....	.....	2.63	.....	0.52	.....	4.54	7.69	.....	.....
Erie & Pittsburgh*	98	29	61,317	2,080	43.82	.....	17.47	17.70	0.858	3.59	4.11	0.44	1.82	6.51	16.47	1.80	1.80
Grand Rapids & Indiana	332	41	125,373	3,058	49.47	32.63	16.00	.....	.....	3.08	8.32	0.49	1.38	5.62	18.89	3.40	2.50
Green Bay & Minnesota‖	240	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Houston & Texas Central¶	554	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Illinois Central, Chicago Div.‡	365	102	263,988	2,588	34.64	.....	15 61	20.81	.....	5.10	4.29	0.30	.....	5.86	15.56	1.40	3.75
Middle Div.‡	101	13	21,987	1,691	43.11	.....	21.98	8.61	.....	1.07	3.38	0.24	.....	5.16	9.85	1.40	3.75
North Div.‡	345	56	128,646	2,297	33.25	.....	16.71	13.54	.....	3.36	4.38	0.28	.....	5.53	13.55	1.40	3.75
Springfield Div.‡	113	12	31,850	2,657	36.03	.....	19.63	13.62	.....	2.56	3.63	0.28	.....	4.72	11.19	1.25	2.90
Iowa Div.‡	401	47	123,142	2,620	30.30	.....	16.02	12.62	.....	3.49	6 88	0.30	.....	5.64	16.29	2.60	5.25
Jeffersonville, Madison & Ind*	226	67	103,884	2,597	41.84	.....	14.25	36.82	0.740	3.63	5.81	.....	1.62	6.09	17.70	2.30	2.50
Kan. City, St. Jo. & Council Bluffs**	247	38	114,604	3,016	50.80	.....	24.30	20.00	.....	3.60	5.49	0.30	.....	5.90	15.20	2.60	3.75
Lake Shore & Michigan Southern, Buffalo Div.‡	...	84	180,016	2,143	34.84	65.49	23.94	.....	.....	3.38	7.65	0.29	.....	6.26	17.55	2.60	5.69
Erie Div.‡	...	117	257,165	2,198	34.22	.....	28.37	.....	.....	3.08	6.84	0.31	.....	5.99	16.82	2.26	5.43
Toledo Div.‡	...	89	186,793	2,098	26.43	67.04	17.01	.....	.....	3.62	10.02	0.40	.....	6.26	20.31	2.67	4.68
Mich. Southern Div.‡	...	207	468,044	2,265	37.36	54.48	22.47	.....	.....	3.34	8.38	0.29	.....	5.92	17.94	3.10	4.68
Little Rock, Miss. River & Texas	...	...	12,073	.....	.....	58.00	11.00	.....	.....	3.50	7.47	16.68	1.63	0.67	29.95	.....	2.90
Louisville & Nashville, Div. ++	470	58	126,366	2,351	29.18	.....	12.87	17.67	1.130	3 90	6.84	0.31	1.59	6.84	19.48	1.97	2.15
Second Div.++	200	34	87,988	2,588	31.01	.....	17.92	14.62	1.260	5.11	6.20	0.23	1.37	6 2	19.11	1.77	2.53
Memphis Div.++	130	17	44,641	2,626	32.98	.....	14.88	13.47	1.140	6.39	8.12	0.31	1.53	5.98	22.33	2.66	2.00
Nash. & Decatur Div.++	122	21	59,92	2,815	26.47	.....	16.58	15.89	1.200	2.50	7 2	0.27	1.35	6.43	15.57	1.74	2.30
South & North Alabama++	189	41	116,153	2,833	32.50	.....	21.43	13.39	1.320	3.70	5.57	0.26	0.56	5.79	15.98	1.71	2.00
Evansville, Hen. & Nash. Div.++	135	30	84,675	2,823	30.14	.....	17 98	14.07	1.310	3.99	4.18	0.23	1.44	6.03	15.87	1.32	1.75
Mobile & Montgomery++	180	36	63,584	2,428	36.65	.....	12.16	12.04	1.230	6.57	7.37	0.12	1.66	6.29	21.90	2.90	3.85
St. Lou's Div.++	337	26	70,732	2,720	43.59	.....	14.16	12.65	1.850	4.64	3.57	0.31	1.95	5.79	16.23	1.50	1.50
New Orleans Div.++	141	22	59,409	2,700	.....	24.30	12.08	17.11	0.870	3.21	5.80	0.47	1.48	5.59	16.53	.....	1.49
Marquette, Houghton & Ontonagon	88	30	51,182	1,706	42.60	.....	24.28	53.00	.....	1.08	10.90	0.40	.....	5.35	17.73	4.50	.....
Missouri, Kansas & Texas‡‡	705	87	304,220	3,497	43.60	.....	17.84	16.60	1.050	4.06	4.33	0.41	0.57	6.04	15.41	.....	.....
N. Y., Penn. & Ohio, 1st and 2d Divs.	228	90	248,031	2,756	34.67	.....	14.13	18.70	.....	3.33	5.86	0.57	.....	6.74	16.50	1.93	2.66
Third and Fourth Divs.	197	43	174,869	4,066	31.02	.....	17.08	18.20	.....	3.38	6.25	0.46	.....	6.01	16.10	1.84	2.66
Mahoning Div.	141	43	154,874	3,602	42.79	.....	19.32	19.70	.....	3.95	4.46	0.40	.....	5.77	14.18	1.58	2.66
North. Central, Elmira & Can. Divs.	147	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pennsylvania, New York Div.§§	12	114	345,630	3,102	34.54	.....	10.94	.....	.....	7.40	9.30	0.80	.....	.....	17.50	3.20	3.75
Amboy Div.§§	204	49	102,516	2,092	49.36	.....	14.33	.....	.....	2.66	6.50	0 60	.....	.....	9.70	3.21	3.76
Belvidere Div.§§	80	38	73,854	1,944	34.12	.....	12.14	.....	.....	10.9	9.50	0.70	.....	.....	21.10	3.20	3.79
Philadelphia Div.§§	206	151	416,155	2,756	26.49	.....	13.66	.....	.....	8.20	4.70	0.70	.....	.....	13.60	1.20	2.72
Middle Div.§§	132	103	301,586	2,928	26.21	.....	15.43	.....	.....	6.80	4.80	0.50	.....	.....	12.10	1.20	2.72
Pittsburgh Div.§§	226	184	464,332	2,524	26.24	.....	11.71	.....	.....	8.70	4.70	0.60	.....	.....	14.00	1.20	2.72
Tyrone Div.§§	110	37	80,414	2,173	21.11	.....	18.38	.....	.....	17.80	5.80	0.50	.....	.....	24.10	1.21	2.72
West Penn. Div.§§	104	21	41,872	1,960	39.77	.....	31.35	.....	.....	2.90	3.10	0.30	.....	.....	6.30	1.20	2.72
Lewistown Div.§§	63	10	18,244	1,824	27.82	.....	19.16	.....	.....	2.96	4 40	0.50	.....	.....	7.86	1.20	2.72
Bedford Div.§§	57	6	12,462	2,067	31.32	.....	25.52	.....	.....	6.10	3.90	0.30	.....	.....	10.30	1.20	2.83
Frederick Div.§§	109	10	21,116	2,112	40.72	.....	18.66	.....	.....	1.20	7.00	0.50	.....	.....	8.70	2.78	3.86
Pittsburgh, Va. & Charleston Div.§§	39	16	22,281	1,393	46.05	.....	16.78	.....	.....	3.20	2.60	0.50	.....	.....	6.30	1.20	2.79
Pitts., Ft. Wayne & Chi., East. Div.*	371	152	444,311	3,923	40.41	.....	20.32	17.10	0 813	2.62	4.26	0.38	2.20	6.50	15.96	1.70	1.70
Western Div.*	280	113	351,252	3,108	41.30	.....	20.65	24.00	0.837	4.82	3.49	0.36	1.73	6.13	16.53	1.44	1.44
Pitts., Cin. & St. Louis, Little Miami Div.*	197	37	108,914	2,944	44.48	.....	13.55	18 44	0.834	4.31	4.88	0.43	2.34	5.94	17.90	2.63	1.50
P., C., & St. L. Div.*	242	102	280,898	2,754	30.00	.....	19.50	21.36	0.640	4.35	3.16	0.31	2.91	5.71	16.44	0.90	2.10
St. Louis & San Francisco*	592	...	164,973	.....	32.00	.....	9.60	.....	.....	2.88	6.92	0.43	.....	5.74	15.97	2.23	1.60
Toledo, Peoria & Warsaw	237	46	120,704	2,624	37.03	.....	17.85	17.85	.....	3.28	3.76	0.36	.....	6.30	13.70	1.30	2.50
West Jersey§§	163	28	60,774	2,171	42.92	.....	14.58	.....	.....	1.20	9.80	0.60	.....	.....	20.60	4.20	4.28

* Five empty cars rated as three loaded ones.
† Switching engines allowed 6 miles per hour; helping engines, actual distance run.
‡ Switching engines allowed 6 miles per hour.
§ Fuel not estimated.
‖ Two empty cars rated as one loaded one.
¶ Switching and work-train engines allowed 6 miles per hour.
** Three empty cars rated as two loaded ones.
†† Switching engines allowed 6 miles per hour; five empty cars rated as three loaded ones.
‡‡ Switching engines allowed 6, work-train 8 miles per hour.
§§ Engineers', firemen's and wipers' wages not included in cost.
The ton of coal is 2,000 lbs., unless otherwise noted; 25 bushels counted to the ton.

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EDITORIAL ANNOUNCEMENTS.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published*

ANTI-MONOPOLY.

There was a meeting in New York last Monday under the auspices of the "Anti-Monopoly League," which, in many respects, reminds us of the Granger movement of eight or ten years ago, though the circumstances are quite different, and the field and the actors are totally unlike. The Granger movement was almost exclusively Western; it was essentially a farmer's movement, and its occasion, if not its cause, was the low price of grain, and of corn especially, throughout a wide territory where grain-growing was the principal industry, and where, after the war, production had been increased beyond the demand at the time, and at such distances from market that the cost as well as the price of transportation at that time was sometimes more than the grain would command in the East or Europe, where it found consumers. At that time the cost of carrying was much greater than now on all railroads, and as almost universally they had a lighter traffic than now, it required greater profits from a given amount of traffic to yield the same amount of net income. For instance, in 1871 it cost the Pennsylvania Railroad Company 0.87 cent to carry a ton of freight one mile, and in that year it carried an average of 1,265,000 tons per mile of road. In 1879 its expenses per ton-mile were 0.427 cent, or less than half as much as in 1871, and there were just about 2,000,000 ton-miles per mile of road. Thus, to make $6,000 of net earnings per mile of road from freight, it would have been necessary in 1871 to charge a profit of 0.48 cent per ton-mile, making the total for cost and profit 1.35 cents, while in 1879 a profit of 0.30 cent per ton per mile would yield the same sum, making a total for cost and profit of 0.727 cent, or but little more than half as much as in 1871. It is true that where traffic has grown so greatly, there has been generally some increase in the capital which provides tracks and rolling stock for it; but in most cases this is covered by a very small addition to the profit; and the result illustrates the fact which we wish to bring forward, that the present "anti-monopoly" movement comes after a period of great reductions in the average cost, price and profits of freight transportation, such as certainly was never known in the railroad system of any other country; and which can hardly be matched in any other industry, extensively practiced, the products of which have continued generally in demand.

For the average prices received for transportation have almost universally gone down much more than the cost. For instance, on the Pennsylvania Railroad the reduction in cost, as we have seen, from 1871 to 1879, was 0.443 cent, but the reduction in *price* meanwhile was from 1.389 to 0.796 cents, or 0.593 cent. So on several roads and groups of roads, as follows:

	Cost			Price		
	1871.	1879.	Dec.	1871.	1879.	Dec.
Boston & Albany	1.526	0.584	0.942	2.090	1.073	1.017
New York Central	1.010	0.541	0.469	1.650	0.796	0.854
Erie	1.010	0.561	0.449	1.616	0.780	0.836
Pennsylvania	0.870	0.427	0.443	1.389	0.796	0.593
Lake Shore	0.913	0.398	0.515	1.391	0.642	0.749
Chic. & Northwestern	1.722	0.738	0.984	3.870	1.480	1.390

Thus, in every case over these roads, the reduction in the price has been greater than that in the cost of carrying freight, and this reduction in price has been more than 50 per cent. within eight years on three of the roads, and on two others very nearly 50 per cent.

And these roads were not selected because they make an unusually favorable showing, but simply as leading lines in different parts of the country, most of which carry freight from a very large part of the country and so have national rather than local importance.

Such a cheapening of what is really one of the principal commodities required by American industry is an economical revolution. There can be no doubt that to it very largely is due the recovery of the country from the prolonged industrial prostration that began in 1873, and the present period of great prosperity and rapid development. Before 1873 settlement had evidently passed the bounds within which, under the then existing circumstances, agricultural production could be profitable. To get corn (and wheat when the foreign demand was light) from Kansas, Nebraska and Dakota to market frequently cost more than it was worth. It was not that the railroads made extravagant profits. Every railroad in Kansas failed to pay interest on its bonds at some time, and most of them, with scores of others in other states, became bankrupt. And if it were not that for several years the grain of the far West was carried for much less than a reasonable rate—a rate which would pay the cost and a reasonable interest on the capital invested in the railroads—grain production for shipment in that part of the country could not have been continued, and millions of acres of plowed land would have been given up to grass again. But it is the nature of railroads that they must continue to work whether they return 20 per cent. or one-tenth of 1 per cent. on the capital invested in them, because that capital cannot be withdrawn. Virtually, the new settlers in the West enjoyed such prosperity as they had, and their farms were saved from becoming valueless, at the expense of those whose capital was invested in the railroads that carried their produce. That is, if the traffic had paid rates high enough to pay reasonable interest on the railroad investments, the farms would have been valueless and the farm-owners ruined. Of course it was not for the benefit of the farmers that the rates were made so low; it was because at higher rates production and traffic would have ceased, or been greatly reduced; and the owners of the railroads who had expected 7 or 10 per cent. preferred 1 per cent., or a fraction of that rate, to nothing and the permanent loss of their capital.

But it was not the farmers of the far West alone that were greatly aided in 1873, and after, at the expense of railroad owners, but nearly all industries in the country, in most of which the cost of transportation plays a great part. The public seems to have forgotten already the terrible reduction of incomes on railroad investments after 1873. There were at one time $300,000,000 of railroad *bonds* on which interest was not paid, to say nothing of stock. And the public all this time was getting the use of all this capital without paying for it. With comparatively few exceptions dividends were either reduced or passed entirely, and here were other hundreds of millions of capital, the owners of which found their income cut off or reduced, while the public was having the full use of the property which it represented. Rates went down, down, down, and in spite of the reduction of expenses so as to make the cost of carriage less than has ever been known elsewhere in the world, even where iron costs but half and labor but a quarter as much, profits went down, too. What would have been the condition of the country if in these years of prostration freight rates in this country had been reduced no more than they were during the similar industrial depression in Europe? that is scarcely at all, the German railroads having been expressly authorized to *advance* their rates just about the beginning of this period.

The general recovery of industry has been largely due, we say, to the great reduction in the cost and price of transportation during the past few years, and especially since 1873. For the extension of agricultural settlements in Dakota, Nebraska and Kansas as far west as the rain-fall makes farming practicable, and to a very great extent the great development of grazing and mining industries still further west, in Montana, Wyoming, Colorado, New Mexico and Arizona, are due to the lower freight rates, which, of course are of transcendent importance where the transportation must be 1,500 to 2,500 miles. But it is largely the development of this new country, the supplying of its demand for clothing, fences, buildings and machinery, that has given the impulse to industry in the older states.

But now that prosperity has come, and in this way, it is remarkable to see a movement which seems to say that railroad capitalists, to whose unwilling sacrifices the prosperity is largely due, shall not share in it. The industry of transportation, which, as we have seen, has reduced the price of its services immensely, and vastly more than the price of any other important and generally used commodity, and which since the return of prosperity has not increased its charges an average of 10 per cent., while many manufactured goods, and especially those which railroads most use, have advanced in price one-third or one-half—this industry, we say, is singled out as guilty of extortion. And this is not in the West, where there are few owners of railroad property, and where, too, the cost of transportation is to most men much more important, but in New York city itself, the great centre of American railroad investments, and where a very large proportion of the people depend for part or most of their income on such investments, and have not had time to forget their sufferings from a suspension of interest or dividends after 1873.

This would be disheartening if there were reason to believe that the demonstration of last Monday indicated a deep, genuine and wide-spread feeling such as was expressed by the principal speaker. But we do not see evidence of such a feeling. In the first place, the country is generally and almost universally prosperous, and a genuine movement of this kind, even if well founded, is not likely to begin at such a time. In the next place, the public probably never in the history of our railroads has had less cause to complain of them. Almost the only rates that have advanced since 1878 are those which for some years before had been much of the time below the bare cost of carrying. The railroads that made large profits last year with very few exceptions made them by carrying much more than the usual amount of traffic, but with no greater profit for the same amount. And as for "unjust discriminations," there certainly never has been a time before when rates were so regular and uniform to all shippers—made so by the "combination" which the Anti-Monopoly League expressly condemns, and without which, or something equivalent to it, it is simply impossible to keep rates uniform to all shippers.

But while there are few indications of genuine popular opposition to railroad, there is doubtless a good deal of opposition on the part of many because of the recent great consolidations, and the union of a great number of companies, still independent, under the control of a comparatively small body of capitalists. That is, there is fear lest some great evil may be done, rather than indignation at anything that has been done on account of the concentration of many roads in few hands. Indeed, we do not remember to have heard of any complaint of public injury actually caused as yet by such concentration. Curiously enough, the event which has called out the most talk of danger from monopoly has been the consolidation of the telegraph companies. We say curiously, because instead of this being a novel condition of things, it is the normal condition of things in this country. For a number of years the telegraph lines of this country, with comparatively trifling exceptions, have been worked by a single company or by a combination of two or more companies, except for a few months at a time when a new company has competed long enough to compel the old ones to buy it out. There is nothing new in the present condition of things except perhaps that the chief control of the telegraphs is exercised by a different set of men. Whatever evil or good results from a monopoly of the telegraphs we have had several years to learn. To us it seems that the unmis-

takable lesson taught by our experience is that in this field effective competition is practically impossible, and that every effort at it simply increases the expenses of the business, which expenses the public has to pay. As to the extent to which monopoly can be attained or competition be effective in railroad business, that is a subject too large to be treated here, and one which has been most superficially treated by the speakers and writers of the Anti-Monopoly League.

CAPTAIN EADS' SHIP RAILROAD.

Since Congress has refused to have anything to do with this project, public interest, even in its engineering features, has sensibly diminished. The manner in which it is generally regarded is shown by the fact that to name it among engineers usually elicits a smile. The scheme has, however, received enough support to entitle it to the dignity of an engineering problem, in which many persons are interested, and which is fairly before the public for discussion and consideration. It is doubtful whether any engineer less eminent than Captain Eads could have taken up the matter with any prospect of securing even a hearing, much less the serious consideration of capitalists, for this project.

In his latest plans he proposes to carry ships 350 feet long, weighing 6,000 tons loaded, in a cradle having 1,380 wheels. This would be equivalent to a train of 172 eight-wheeled freight cars, each loaded with 35 tons. It would not be difficult to build cars of such capacity, and, in fact, such loads have often been hauled on eight-wheeled cars. It would be absurd, too, to say that it would be impossible to haul trains of 172 such cars, especially if an engineer was permitted to fix the gauge of the road. These considerations, then, at once place the question, so far as the load to be carried and the number of wheels required are concerned, within the limits of possibility, or rather practicability.

The feature of such a railroad which has received most consideration is the construction of the receptacle or vehicle for the ship. All sorts of plans for this have been proposed. One of the chief difficulties which it was thought would be encountered is that of supporting the ship without injury to its hull. To overcome this, it has been proposed to hang it in slings, to float it in a tank to be carried on wheels, to imbed it in sand or cement. A patent has recently been granted to Captain Eads for "ship railways and cars therefor," in the specifications of which he says:

"My invention consists in the combination, in a ship railway car and cradle, of a system of hydraulic jacks to afford stable and uniform support to all parts of a ship's bottom, and a connected system of hydraulic jacks to compensate for irregularities in the track and prevent local strains on any part of the cradle."

The accompanying figures are copies of some of the drawings appended to the specifications. In the latter his invention is described as follows:

"My combined car and cradle for ship railways is divided transversely into sections, any number of which are used, as may be demanded by the length of the ship. Each section consists of a number of girders, *L L*, extending transversely beneath the ship's bottom and vertically to a sufficient height on each side, and longitudinal beams or girders, *M M*, connecting the said transverse girders, *L L*. The cradle-sections thus formed rest on the truck-frames *T T* through the medium of a system of hydraulic jacks, *N N*, connected by pipes, *n n*, so as to allow relative vertical movement of the truck-frames, and thus compensate for irregularities in the height of the rails. Upon the girders *L M*, which constitute the base-frame of the cradle *C*, are hydraulic jacks, *O* and *O'*, arranged in three or more longitudinal tiers. The central jacks, *O O*, support the keel of the vessel, while the side jacks, *O' O'*, support the bilge. The jacks *O* and *O'* are connected by pipes *o* throughout the entire system; hence it will be seen that the pressure on all the parts of the ship's bottom is equalized, and my improved cradle adapts itself automatically to the bottoms of vessels of various shapes with the desired equalized and uniform pressure. Stop-cocks or valves, *S S*, are employed to confine the water within the jacks and thus fix the plungers in the positions which they have assumed, so as to make the uniform support stable and unyielding."

His claim is as follows:

"A ship-railway car and cradle constructed with a connected system of hydraulic jacks having stop-cocks or valves, to apply supports automatically with uniform pressure to all parts of a ship's bottom simultaneously and lock them in the positions in which they are thus set, and with a connected system of hydraulic jacks beneath the supporting bed or cradle to compensate for vertical irregularities in the track."

Unfortunately for this patent, the invention is not new. The patent was granted Jan. 11, 1881, the application having been filed May 8, 1880. In an editorial article published in the *Railroad Gazette* Aug. 8, 1879, the following sentences occur:

"It would seem as though a system of pipes and hydraulic jacks, all connected together, could be arranged in the cradle underneath the ship, so that by producing a pressure in the pipes exactly the same pressure would be transmitted to each plunger of the jacks. The liquid used in the pipes would thus become a perfect means of equalizing the loads on the points of support."

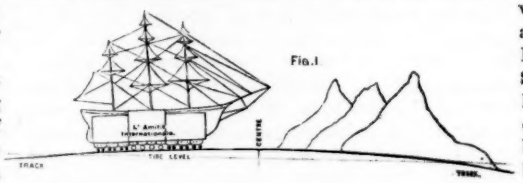
Although this was written nearly a year before the application for Captain Eads' patent, we find that another was granted on Jan. 25, 1881, to Ewald Bellingrath, of Dresden, Saxony, for very much the same device described in Captain Eads' specification. Bellingrath describes his invention as follows:

"It is especially intended to be applied for transporting vessels over land where canals are not feasible, or from one level of a canal or a river to another where there are no locks between the levels. Each separate carriage is provided on its opposite sides with one or more hydraulic cylinders and the cylinders on either side of the train are put into communication with each other by pipes. The pistons of the cylinders carry cross-beams and a flexible platform, upon which the vessel rests during its transport. A uniform distribution of the weight of the vessel on the different cylinders is thus attained, howsoever the vessel may happen to be bent, and this uniformity is maintained during the motion of the carriage, even when variations in the incline of the road or inequalities in the same occur."

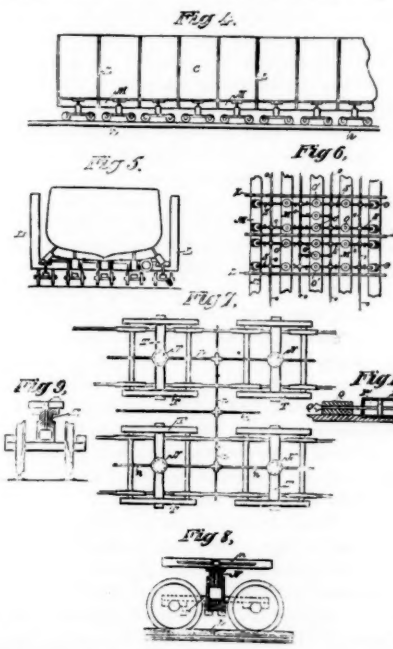
The following are the first and the last claims of Bellingrath's patent:

"1. The combination, with a train of wheeled carriages for the conveyance of ships, boats, and other heavy loads upon rails, of a series of cylinders containing a suitable fluid, and in communication with each other, and provided with pistons adapted to carry the entire load, which is thereby supported uniformly, whatever may be the differences or the variations of the distance apart between the bearing-points of the load, substantially as hereinbefore described.

"6. The combination, with a carriage or train of carriages for the conveyance of ships, boats and the like upon rails, of a series of communicating hydraulic jacks between the supporting-bed and the trucks to equalize the pressure upon the trucks and compensate for vertical irregularities of the track."



Although this American patent was granted on the 25th of January, 1881, the application therefor was filed Sept. 12, 1879, and the invention was patented in Germany, Nov. 5, 1878, in England, March 11, 1879, in France, Feb. 20, 1879, and in Belgium Feb. 24, 1879.



Bellingrath's invention is, therefore, ahead of both Captain Eads and the *Railroad Gazette*.

The question of the priority of invention is of very little interest compared with that of the practicability of the project, which, although often proposed, has never until now engaged the serious attention of experienced engineers.

In some respects Captain Eads has modified his plans, noticeably in abandoning his intention of providing for the very largest vessels. This seems especially wise, for if the plan succeeds with the smaller ships there will be no difficulty in enlarging the capacity of the same railroad afterwards, while it is placing a needless task upon the designer to adapt it to a class of vessels which certainly do not now appear in that trade, and probably would not, or, at any rate, need not. Captain Eads' first plan, as given in his original letter to the New York *Tribune* over a year ago (see *Railroad Gazette*, Aug. 8, 1879), was designed for ships 500 ft. long weighing 10,000 tons, and carried on 1,000 wheels, giving a total load of about 12 tons per wheel. In his recent address before the San Francisco Chamber of Commerce (Aug. 11, 1880) he had reduced these limits to ships 350 ft. long, weighing 6,000 tons, and carried on 1,380 wheels, giving a total load of 4⅓ tons per wheel as stated, but allowing for the weight of the car itself, about 5½ tons. Captain Eads has also—very wisely it would appear—abandoned the idea of making up his cradle to order, of sections 100 ft. long, in favor of single structures for ships of various sizes, and above all he no longer proposes to make his car self-propelling. For a car which has to be backed down into the water this would be quite unnecessarily cumbersome and expensive. On the proposed maximum grades of 52.8 ft. per mile, five or six powerful locomotives of ordinary types, perhaps combined in pairs end to end, with the tender alongside resting on the parallel rails, would be ample for all requirements, and by far the most convenient and economical. There is enough that is new in the project without inventing new forms of motive power.

Not the least of the advantages of the ship railroad over the ship canal is that the distance and altitude surmounted become comparatively unimportant factors, and accordingly Captain Eads seems to have changed the proposed location of his railroad from Panama or Nicaragua to the isthmus of Tehuantepec in lower Mexico. This gives a much shorter route from Pacific ports of the United States to Atlantic ports of the United States (between which, however, the traffic is very light), and a somewhat shorter one between Europe and our own Pacific ports, but a longer one from Europe and the United States to the west coast of South America; but the distance (150 miles) and the height of the summit have thrown it practically out of court as a route for a canal. On a ship railroad, however, if a speed of 8 or 10 miles per hour is practicable, the entire period of transit, and even more, could be utilized, if necessary, as Captain Eads suggests, for cleaning and repairing the hull and other dry-dock purposes.

In two respects, however, Captain Eads has not yet deviated in any way from his original plan, and it seems that perhaps he seriously errs therein. At any rate, discussion is in order, and has interest as an abstract question of engineering, if nothing else.

Captain Eads proposes to pass from one grade to another as follows:

"To avoid bending the ship in changing from one grade to another, the cradle would be run on to what may be called a tipping table, placed in the line of the railway. This would rest on a fulcrum at the middle and on hydraulic rams at each end, so that the ends could be raised or lowered to conform to the different grades."

This costly and inconvenient expedient seems quite unnecessary. For let us take the sharpest change of grade which Captain Eads would probably require, at any one point—that namely from his descent into the sea—on a grade of 1 foot per 100—to a level. A vertical curve connecting these two grades of such proportion that the *rate* of grade changes 0.025 feet, or about ¼ inch in 100 feet, would be only 4,000 feet long; and at the centre would be only ten feet below the grade of Captain Eads' "tipping-table"—a position which would ordinarily fit the ground quite as well, to say the least, as to carry the grades straight to an intersection. The convexity of such a curve in the length of the proposed cradle—350 ft.—would be equal to 0.03828 ft., or less than half an inch. Therefore, it is only necessary to compress the hydraulic plungers in the middle of the cradle one-fourth of an inch more, and at the ends of the cradle one-fourth of an inch less, to eliminate this convexity entirely and leave the cradle and ship unaffected.

But even such provision seems unnecessary. So moderate an irregularity of support as that discussed above is very far within the safe "elastic limit" of any seaworthy hull, and probably is exceeded constantly in the water. For if a ship draw 20 ft. of water, it is only necessary to have the water about two feet below the water line amidships, and about two feet above it at bow and stern to produce precisely the same strains as such a vertical curve, assuming the cradle itself to be without stiffness, with the important exception that on land these strains would be almost purely "static" or quiescent, while at sea they are "dynamic" in a high degree, and from their rapid and irregular alternation much more trying and injurious. At least it would seem so.

That such deflection would amount to nothing in the hull of a seaworthy steamer seems probable also by comparison with the admissible deflection of bridges. A limit of $\frac{1}{1800}$ of the span, or about two-thirds of an inch deflection per 100 ft. of length, is considered reasonably stiff. This would amount to 2⅓ in. in a span of 350 ft. Without having figures to prove it, we presume the deflection can hardly be less in a sea-going vessel in active service. It would be entirely invisible to the eye.

We may, therefore, conclude that on such a vertical curve—without making any change whatever in the cradle—a portion of the convexity or concavity, say half, would be taken up by the elasticity of the hull, and the remainder transmitted to the hydraulic plungers; but if it were all concentrated in either

place, it would do no harm. It therefore seems clear that instead of having no breaks of grade, such a ship railroad should be, or at least might be, almost one continuous series of gentle vertical curves.

It has, in fact, been proposed by Mr. George N. Copeland, of Massachusetts, to make the road a continuous curve, as indicated in the accompanying engraving. The cradle for the ship was then to be conformed to this profile. The plan would be an excellent one if the configuration of the country could only be made to suit it.

In the matter of the vertical alignment, Captain Eads seems to have been unnecessarily cautious. Neither does his proposed plan or expedient of turn-tables for every change in the horizontal direction of his line seem to be essential. It is certain that the latter would be a most annoying and clumsy expedient, as well as very expensive.

The turn-tables themselves would be nearly as costly and cause nearly as much delay as a lock. For this reason they must be introduced as sparingly as possible, and, under ordinary topographical conditions, would be almost certain to necessitate very heavy earthworks in between them and be very apt to come on deep fills, and require massive masonry foundations. We should judge it to be a reasonable estimate, in ordinarily rough country, that the substitution of turn-tables for curves would very nearly double the cost of the line to sub-grade. The turn-tables and tipping-tables would also be a grave obstacle, and in fact the only obstacle, to enlarging the capacity of the cradles thereafter, if there should be a demand for the carriage of a larger class of ships—a very serious consideration in this age of rapid progress.

If the limit of curvature were fixed at say 4° =1,432 ft. radius, it would seem that an arrangement of trucks could be devised which would adjust themselves to such an alignment. Thus let all the wheels be collected together into four clusters, each cluster forming an immense truck with a transverse beam or bolster across its centre. Then divide the cradle into four equal parts lengthwise, and place one truck under the centre of the front part, and another under the centre of back part, at a distance of one-eighth the length of the cradle from each end, and attach them thereto so that they can turn on a centre as an ordinary car truck does. As the weight which the centre-plates must carry would be enormous, the centre-pin should be a hydraulic plunger, so arranged that the weight would be supported on a fluid, and thus permit the truck to turn freely. The other two trucks should be placed under the two middle quarters of the cradle, so that their centres will be at a point three-eighths of the length of the cradle from the ends. The cradle could then be suspended from the bolsters of these middle trucks by swing hangers or links, as the bolsters are on ordinary passenger car trucks, so as to swing laterally. With 4° curves and a cradle 350 ft. long, if the trucks were located as proposed the two middle ones must move laterally about 5 ft. each way from the centre. If the swing-hangers or suspending-links are made 10 ft. long, their lower ends would swing through an arc of 60°. By attaching them either at their upper or lower ends to hydraulic rams, the vertical movement due to their oscillation would have no effect upon the distribution of the weight, and by connecting these rams with those which support the centres of the end trucks, the weight would be perfectly equalized between them.

It would be easy to enter into much fuller detail, but it does not seem worth while to do so until there is a more immediate prospect of the construction of the railroad. Before investing fifty or seventy-five millions in such an enterprise it would seem very much the wisest course to construct an experimental cradle, dock and track, with both vertical and horizontal curves in it and test it by actually handling a ship. This could be done in this country at much less expense than in Central America, and if successful could readily be taken up or down—whichever it is—and transported to the isthmus and relaid there.

Decisions Involving Construction and Repair.

The recently published volumes of court reports comprise a number of novel decisions illustrating the obligations of the companies relative to keeping their fences, rolling-stock, warehouses, repair-shops and other accessories in good and safe condition.

The Atlanta & West Point Railroad company fenced its track with the lately invented barbed-wire fence—constructed of twisted wires, in which are fastened pointed bits of wire, considered to be especially adapted to deter animals from crossing or pushing down the fence. The fence in question was made by erecting posts about a rod apart and connecting them by wires; the top of the fence being about three feet from the ground. One day a horse strayed upon the road-bed; a train approached; the horse ran along the track a short distance, then crossed to the side of the road, and, in his fright, fell upon or endeavored to struggle over the fence. He was badly injured, not by the train but by the sharp barbs. His owner sued for damages. Some decisions which have been rendered are seemingly adverse to such a claim, for in instances where the animal has died of fright, or has been hurt—has broken a leg or the like—in endeavoring to escape from the proximity of the train, the courts have said that the company was not liable; that to give the owner a right of action the creature must be struck by the train. Much may depend, in such cases, on the language of the statute of the state regulating railroad fences. In the present Georgia case the decision was against the company. The Court declares that a fence three feet high and composed of two wires armed with projecting barbs is not such a fence as will, by the law of Georgia, justify a railroad company using it in relaxing the full measure of diligence required by law in guarding against injuries to live stock from the running of trains. On the contrary, if the wires would impede stock in escaping from the vicinity of the track when in danger, and would involve them in risk of injury by being caught or thrown in attempting to get over or through the fence when endeavoring to escape from a train, due care not to frighten or drive them upon the wire fence would be no less incumbent upon the company than the use of diligence to avoid injuring them upon the track. If a company will erect a fence dangerous to flying animals, its agents must manage the train with reference to a double or compound danger—that of injury from the train and that of injury from the fence. The testimony of the witnesses as to what was done at the time of the casualty was conflicting. The horse-owner's witnesses declared that the engineer blew the whistle merely, which frightened the animal off the track, while he drove the train onward at full speed. The employés testified that the train was slackened in speed and everything possible done to avoid injuring the horse. The Court considered that, in order to establish a defense, the company should have shown that pains were taken to avoid inciting the animal to throw itself upon the fence.

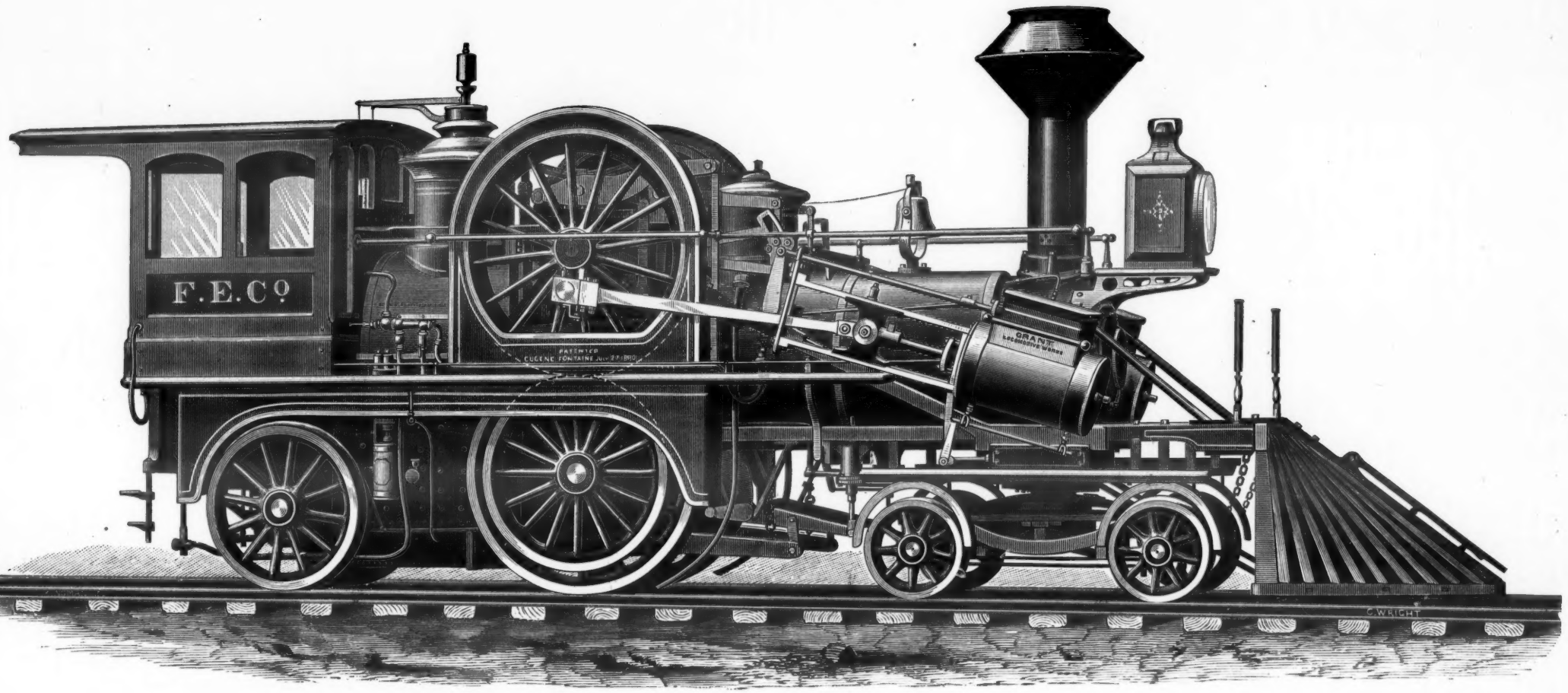
If this view should be generally accepted in the courts, there will be an objection to barbed-wire fence which has not hitherto been considered. The principle has some confirmation from a recent decision in England. The owners of a cattle market placed a statue in the grounds, around which was a fence surmounted by sharp points. A cow brought to market by dealers endeavored to jump over the railing, and was injured so that she died. The Court of Appeals held that her owners could recover damages if they were not negligent in the manner of driving the cow; for the owners of the market were bound to have it in safe condition for their customers.

Neglect to maintain fences is presented in a novel aspect in an Illinois case. The road was operated by a receiver. He allowed the fences to get out of repair for some two months. Some cattle got upon the road in consequence, and an engine which ran against them was thrown off the track, and a fireman was killed. Suit was brought for damages, upon the theory that although the person killed was an employé, yet the primary cause of the disaster was the negligence of the receiver, representing the company in matters with which the employé had no duty or concern. But the Court decided that the case would not hold, saying that the obligation of a company to fence is one due to the general public, not to employés. It is for the protection of passengers from train-wreck and for the preservation of live stock of the vicinity from slaughter that the companies are required to maintain fences. The duty does not enter into the engagement between the company and its hired train hands.

A difference of opinion prevails among the courts of the various states on the question of liability for fire communicated by locomotive sparks, and particularly whether the courts should take it for granted that such a fire is probably attributable to some fault in the management of the engine or whether the land-owner should be required to show some specific negligence. Two Missouri cases have been decided taking the view that in that state proof that a fire was communicated by sparks from a locomotive attached to a passing train is sufficient, in the first instance, to entitle the land-owner to recover damages; if the injury was, in truth, an inevitable accident, that is for the company to show. The witnesses for the land-owner in these cases could not say that they saw the sparks fly from the locomotive and set fire to the grass; all they would swear was that they saw the locomotive pass, throwing out smoke and sparks, as a locomotive usually does; that the season was very dry and the grass on the road-bed and in the adjoining fields was parched; and that almost immediately after the train had passed the fire in question broke out in the grass without any obvious cause. The Court considered this evidence sufficient to warrant believing that the engine started the fires. In one of the cases, however, the fire began in dry grass in the roadway, and, after burning there for some hours, spread to the adjoining field; and the ground for claim against the company was that its servants had failed to extinguish the fires on the roadway. The Court said that this was not a ground of action. A man who is burnt out is not liable in damages to a neighbor to whose house, next door, the fire spreads; neither is a railroad corporation liable because a fire on its premises extends to adjoining lands. In order to recover, the land-owner must show some fault in the origin of the fire. This portion of the decision has been severely criticised by a writer in the *Central Law Journal;* it may not be approved in courts of other states.

A storage of gun-powder in a Colorado depot gave rise to a singular lawsuit. A clothing merchant sent a quantity of clothing to Denver and it was stored in the railroad company's warehouse. By the same train 160 kegs of gunpowder were received, and this powder was placed in the same warehouse; the two lots were, however, somewhat separated, the drygoods being in one end of the warehouse, the powder in the other. The warehouse took fire. The firemen came, but on account of apprehension of an explosion, they would not go near enough to the burning building to work efficiently. They did what they could at a distance of seventy or eighty feet, but the building was substantially destroyed and the drygoods with it. It was agreed that the railroad company had ceased to be a carrier and was only warehouseman of the goods. But the Court decided that storing any considerable quantity of gunpowder in the same depot or station with other goods is negligence. This is the rule as to warehousemen generally—no prudent man would store a large quantity of gunpowder in a building with other goods, in a populous city—and a railroad company is not excepted from the rule. It is not bound to carry gunpowder; still less is it bound to store it in its warehouse. The consignee may be required to take it away at once, or it may lawfully be stored in a special and safe place of deposit. Putting it in the warehouse of the company where ordinary merchandise is stored is not an exercise of reasonable care for preserving the other merchandise. The counsel for the company argued that in point of fact the goods were not destroyed by any explosion of the powder, but were suffered to burn through the timidity of the firemen, and hence that the cause of the loss was the inefficiency of the fire department. But the Court considered that the apprehensions of the firemen were reasonable, and that the real cause was in the injudicious storage. The presence of the powder in effect prevented the extinguishing of the fire.

Work in the repair shops has given rise to two decisions turning upon the obligation of the companies to furnish workmen in the shops with sound and safe apparatus and tools for their work. The general principle that employés are understood to accept risks of injury which are incident to the employment has a peculiar application to workmen in repair shops. Their engagement is to deal with defective, worn, and broken machinery; and in so far as danger arises from the defects in cars or engines needing repairs they cannot complain. Thus in a New York case the man hurt was employed as a yard switchman. The course of business was that on arrival of any train each car was inspected and any one found defective was marked "crippled;" and it was the business of the switchman to assist in shifting these crippled cars upon a track running to the repair shops. His hand was crushed through defect in the buffer of one of these crippled cars. The Court said that he was not entitled—as an ordinary train hand is—to demand to be furnished with cars in good condition; the nature of his engagement was dealing with crippled cars. But the men in the repair shops are entitled to claim that the engines, apparatus and tools furnished them for doing their work shall be well made, of good materials, and kept in good repair, or at least properly inspected. In an Illinois case a boiler-maker employed on the Chicago & Alton Railroad and engaged in riveting the smoke-arch of a portable engine had his eye put out by a fragment of steel which broke and flew from the tool he was holding on a rivet while another man struck it with a heavy hammer. He claimed that the tool—a "button-set," as engine-makers call it—was made of poor steel; and the Court said that if this could be proved and he was himself careful in his manner of working, he was entitled to recover damages. A com-



THE FONTAINE LOCOMOTIVE,

Built by the Grant Locomotive Works, Paterson, N. J.

(Copyright, 1881, by the Railroad Gazette, 73 Broadway, N. Y.)

pany is not an insurer that the tools it furnishes in the repair shops are absolutely safe, but it is bound to take reasonable care that they are good, and if the work is of a dangerous nature a high degree of care on the part of the company is required.

The Illinois Central Report.

The Illinois Central report for 1880 is the first that reaches us for the calendar year, and is as rich as usual in information, and especially in interesting traffic statistics. The most remarkable feature in the business of the year is the astonishing increase of 42 per cent. in passenger traffic, with but insignificant additions to the mileage worked and these new lines with but light passenger traffic. Aside from the general recovery in passenger business, and the vast addition to the suburban traffic mentioned later, we can assign no other cause for this than the two passenger wars in which the road was involved during the year, one with the Louisville & Nashville, which for sometime caused the rates between the North and South to be very low, and doubtless greatly increased travel; and the other the conflict over Chicago-St. Louis travel, of which the Illinois Central has a share. The effect of these wars is probably further seen in the reduction of 18 per cent. in the average rate received from passengers, which for many years previous had changed very little. There was, however, an increase of more than 16 per cent. in the passenger earnings, so on the whole this branch of the business must be regared as unusually prosperous, as well as unusually large, especially as the increase of 42 per cent. in traffic was carried with an increase of only 10 per cent. in passenger train mileage. In freight traffic there was an increase of 13.7 per cent., which is large, but not surprising, and is a rate of growth too common to excite remark. Further, there was an increase of 18.2 per cent. in the freight-train mileage, and so a decrease in the average train-load; there was a slight increase (1.3 per cent.) in the average freight rate, but as working expenses increased 21.3 per cent., it is doubtful if the profits from freight were as large as in 1879. In both passengers and freight this road has exceptionally small train-loads—about 37 passenger and 110 tons of freight last year.

The mileage, gross and net earnings and working expenses of the Illinois Central Railroad for ten years have been:

Year.	Miles.	Gross earnings.	Expenses.	Net earnings.
1871	1,007⅞	$8,401,142	$4,641,920	$3,759,222
1872	"	8,026,754	4,846,854	3,179,899
1873	"	8,268,325	4,600,109	3,668,216
1874	"	7,900,721	4,030,151	3,870,570
1875	"	7802,556	3,989,447	3,813,109
1876	"	7,040,969	3,845,643	3,195,326
1877	"	6,639,845	3,122,443	3,517,402
1878	1,256	7,111,184	3,087,455	4,023,729
1879	1,256	7,234,464	3,026,700	4,207,764
1880	1,320	8,304,812	3,672,971	4,631,841

The increase in mileage in the last three years consists of branches of the Chicago Division in Central Illinois, two of which connect the main line with the Chicago Division, and the third of which will when completed. They are in a productive agricultural district, with other railroads so near by that their local traffic is limited, and their earnings cannot be very large, though as the lines were built at very small cost they may be very profitable; and as most of the traffic of the main line from Centralia to Dubuque seeks Chicago, they enable the company to carry its freight over its own road, where otherwise it would have to give the traffic to other lines (as heretofore). The increase of nearly 15 per cent. in gross earnings is the greatest ever made in a single year, and makes the gross earnings the largest since 1871. From 1873 to 1877 there was a constant decrease, and since that time there has been a constant and quite rapid increase, which doubtless has been aided somewhat, but certainly not very much, by the new branches.

The course of the traffic in the same ten years is shown below:

Year.	Passenger-miles.	Ton-miles.	Year.	Passenger-miles.	Ton-miles.
1871	50,590,800	262,150,400	1876	51,238,031	264,602,314
1872	51,779,991	272,290,900	1877	46,076,845	249,345,911
1873	48,503,682	275,303,422	1878	43,849,207	306,345,691
1874	51,115,268	273,559,253	1879	44,586,972	335,470,860
1875	50,828,505	284,650,911	1880	63,306,528	381,288,482

Thus, as we have often pointed out, the traffic of this road until 1878 showed less progress than that of any other important line in the country. The decline in passenger traffic was common enough on other roads, but the instances are few indeed in which an important railroad carried less freight in 1876 and 1877 than in any of the four years next preceding. So much the more satisfactory has been the large and constant increase since 1877—22 per cent. from 1877 to 1878, nearly 10 per cent. from 1878 to 1879, and 13.7 from 1879 to 1880; while, as we have already said, the growth in passenger traffic last year was altogether phenomenal. Nearly one-third of the whole increase was in the suburban traffic on the 15 miles between Chicago and Kensington, which is almost a city traffic (there being stops at many streets), and was provided for last year by entirely new trains, something like those of the New York elevated roads. Aside from this, however, there was an increase of 31.8 per cent. in the other passenger traffic.

There is a good deal of interest in the relative amounts of north-bound and south-bound freight on this road, especially since it acquired control of its New Orleans line. We are able to trace these two currents, as the tonnage-mileage in each direction is given in the reports. For nine years they have been as follows:

Year	Ton miles—South.	Ton miles—North.	Year	Ton miles—South.	Ton miles—North.
1872	142,906,856	129,384,044	1877	124,716,529	124,629,412
1873	164,371,259	114,432,163	1878	144,071,320	162,274,371
1874	165,433,306	108,125,887	1879	170,224,546	165,246,314
1875	160,308,138	124,342,773	1880	198,367,516	182,920,966
1876	121,018,659	143,583,655			

If we go back only a few years, we see there has been a great change in favor of the southward movement. In 1876 only 46 per cent. of the freight was south-bound, in 1878, 47 per cent.; in 1880, 52 per cent., but if we go still further back we find that this is only a reversion to the former condition of things; for in 1872, 58 per cent., and in 1874 more than 60 per cent. of the freight was south-bound. Of course only a small fraction of the south-bound freight crosses the Ohio, but the difference in the movement is nevertheless important. When lake rates are very low, the northward tendency is much greater than when they are high, and the higher lake rates last year probably had much to do with the greater southward movement then.

In common with most roads the Illinois Central shows a large increase in working expenses in 1880, but it is only about in proportion to the increase in traffic, and the expense per unit of traffic was not much changed.

There was an increase in every important item of expenses, and more than one-half of the whole was in maintenance expenses (44 per cent. in maintenance of structures, 26½ in maintenance of equipment, and 26 in maintenance of way).

The prosperity of the South is of special advantage to this company, not only because of its effect on its own traffic, but because of its great investments in the road from Cairo to New Orleans, which, with a continuance of Southern prosperity will soon yield a large income.

The Iowa lines, whose earnings for a long time had been comparatively stationary, and in 1879 were, with one exception, less than in any other year since 1872, last year increased one-sixth, and were larger than in any previous year except 1875, and it is to be hoped that the traffic on this line has at last fairly begun to grow, as it is sure some time to do till it is three or four times as great as at present.

Foreign Railroad Notes.

The report we published some time ago, made to the French government, that the Paris, Lyons & Mediterranean Railroad Company, the greatest of the six great French companies, would probably adopt the Westinghouse automatic brake for its whole passenger rolling stock, has been justified. It is now announced that it has made a contract for supplying fittings to 1,500 cars, as a first installment. This company at the end of 1878 was working 3,557 miles of road in France, besides some 55 miles in Algeria. The Western Railroad of France, which adopted the Westinghouse brake some time ago, worked 2,716 miles of road at the same date. The Northern, which has adopted the vacuum brake, worked 1,426 miles. It is said that the Mediterranean Company will spend about $1,600,000 in equipping its entire passenger stock with the brake.

The Russian Minister of Transportation has recommended the Russian railroads that form parts of grain export lines to the Black Sea, the Baltic and to Germany, to put a stop to the reductions they have made to meet competition form the export business, and to agree upon higher rates, basing his recommendations, at least partly, on the need of the grain this season in Russia itself.

They have "booms" in railroad stocks in Europe as well as here. An Austrian company, the Elbe Valley, whose stock was quoted at 29 in 1876, at 43 in 1878, and at 118¾ in 1879, was up to 200 last November. But it had gone down as well as come up, for it stood at 187½ in 1871, and thence in successive years ran down to 181¾, 97½, 72½, till there was no quotation for it in 1875, and 29 was the figure in 1876.

An Austrian manufacturer of railroad supplies is offering to railroads a semaphore signal arm whose surface is a parabolic curve and at night is illuminated by one or more lanterns, so that the signal by form is used by night as well as by day, and colored lights are not depended upon. In the most unfavorable weather and fogs it is said to be visible 1,300 to 1,600 ft., and it is designed so as to be attached to the semaphore masts already in use.

In Austria-Hungary there were 37 miles of new railroad opened for traffic in 1880, in five different lines, against 87 in 1879, which does not make much of a show when compared with the 7,150 miles which were built in the United States last year.

"Fernsprechvermittellungseinrichtung," is one of the words which the telephone has introduced in Germany, leading people to doubt whether that instrument is a time-saver after all. Baron von Weber tells a story of a lady and her servant in Buffalo, who, during a visit of his at her house last summer, in forty minutes with the telephone transmitted orders and made negotiations in his presence which would have required forty hours of time running errands, carriage-riding, etc.; but these people must have telephoned in English, and avoided such terms as Fernsprech—etc., etc., etc.

Baron von Weber contributes to a German newspaper an account of the change of gauge of the New York, Pennsylvania & Ohio Railroad last July as a striking example of the efficiency of American railroad employés in matters which require individual intelligence and initiative, in spite of some evident defects in training and discipline.

The Borsig Locomotive Works at Berlin, when there is an ordinary demand for engines employ 3,000 men, and can turn out 200 to 250 locomotives a year. In the works are five steam boilers and 11 steam engines, with an aggregate of 250 horse-power. The first locomotive was turned out there in 1841. The second, turned out in 1842, shown at a Berlin industrial exhibition, Borsig named after Professor Beuth, who not many years before had dismissed him from the Royal Polytechnic Institute for his lack of interest in chemistry, which was the occasion of entering upon his career as an engine-builder. In 1846 Borsig completed his 100th locomotive, in 1854 his 500th, in 1858 his 1,000th, in 1867 his 2,000th, in 1873 his 3,000th, in 1876 his 3,500th. The works have suffered lately like other railroad industries in Germany. Only 80 locomotives were turned out in 1876, 44 in 1877, 76 in 1878, and 35 in 1879. At the end of 1879, out of the whole number of 3,709 locomotives that had been built at the Borsig Works 2,845 had gone to Germany, 718 to Russia, 59 to Holland, 50 to Sweden, 27 to Austria, 6 to Denmark and 4 to India. Borsig has an iron works connected with his locomotive works, and this must now be the most important part of the establishment.

Relative Strength of Bolts with the Sellers and with V Screw Threads.

A copy of a "Report of the Board to Recommend a Standard Gauge for Bolts, Nuts and Screw Threads for the United States Navy," which was made in 1868, has been sent to us. Whether this has ever been printed before we do not know, but the copy received bears the imprint of the Government Printing Office and is dated 1880. The report is new to us, and probably will be to most of our readers. The Board recommended the Sellers system of threads and sizes of nuts and bolt-heads.

The special thing to which attention is called is the following table, giving the relative strength to resist tension and torsion of bolts with the ordinary V threads, whose sides have an angle of 60° to each other, and those cut with a Sellers thread. The strength of the bolts with a V thread is represented for all of them by 1, and the relative strength of the bolts with the Sellers' thread by the quantities in the third and fourth columns.

Diameters of bolts.	Strength of bolts with V threads	Relative strength of bolts with the Sellers Thread. To resist tension.	To resist torsion.	Diameters of bolts.	Strength of bolts with V threads	Relative strength of bolts with the Sellers Thread. To resist tension.	To resist torsion.
In.				In.			
¼	1	1.283	1.454	2	1	1.124	1.191
5-16	1	1.231	1.366	2¼	1	1.107	1.164
⅜	1	1.215	1.339	2½	1	1.108	1.167
7-16	1	1.209	1.329	2¾	1	1.096	1.148
½	1	1.189	1.297	3	1	1.101	1.156
9-16	1	1.178	1.280	3¼	1	1.092	1.141
⅝	1	1.170	1.275	3½	1	1.092	1.143
¾	1	1.155	1.242	3¾	1	1.093	1.142
⅞	1	1.146	1.223	4	1	1.086	1.131
1	1	1.141	1.219	4¼	1	1.084	1.119
1⅛	1	1.140	1.227	4½	1	1.083	1.127
1¼	1	1.127	1.197	4¾	1	1.083	1.127
1⅜	1	1.141	1.218	5	1	1.082	1.125
1½	1	1.124	1.192	5¼	1	1.077	1.118
1⅝	1	1.124	1.192	5½	1	1.078	1.119
1¾	1	1.128	1.198	5¾	1	1.074	1.113
1⅞	1	1.117	1.181	6	1	1.075	1.115

From this table it will be seen that a ¼ in. bolt with a Sellers thread has 28 per cent. greater strength to resist tension and 45 per cent. more to resist torsion. A ½-in. bolt with a Sellers thread has nearly 19 per cent. more tensional and 29 per cent. more torsional strength than one with a V thread. The percentages with a ¾-in. bolt are 15½ and 24, and for a 1-in. bolt 14 and nearly 22. It will be seen from this how much economy will result from the use of the Sellers system of screw-threads. Bolts with such screws may be made of less size and have the same strength, or if of the same size they will have more strength. This feature as an argument for the adoption of the Sellers system of threads has never received the consideration that its importance deserves.

Railroad Esprit du Corps.

A railroad, considered as an organization of men, resembles an army more nearly than any other industrial organization. It has its recruits, its veterans, its subordinate and superior officers; and it has its promotions and places of honor.

Nevertheless, railroad men seem to have largely neglected that which is the very life of an army, namely, its *esprit du corps*.

It is not to be greatly a matter of wonder if those whose attention has been fixed on the mechanical improvement of the road, and whose experience has so richly repaid attention to the brakes, road-bed, rails and signal system, should come to view the man of the road in a somewhat mechanical light. "If these men do not serve, get better ones" (not, "If these men do not serve, *make* better ones,") would naturally be the first thought of such minds.

Men, however, must be treated as men, if much is to be gotten out of them. This does not mean that they are to be paid for their work, and to get enough to live on, but that their deeper feelings and motives, the quiet enthusiasm in them, must be touched. A road which has nothing to offer men but money will never get the best service out of them.

When a man is intrusted with a definite, visible piece of work, and gets credited and is honored if he performs it with distinguished excellence, it being regarded as *his* work, he is much more likely to take pride in his work than when he is but one of a number who do a work in common, and for which no one, except perhaps the officer in charge, gets any special credit, however well done. So when possible it is well to give a man charge of a machine, an engine, a section of road or a special subdivision or unit of a great work. Else he is likely to feel, what interest have I in the road?

Again, why should not an engineman be responsible for one, two or three firemen—for their discipline and moral character as well as for their training? The writer has visited some of the best roads in this country, but on that one where there was among the men apparently a higher degree of intelligence and certainly a higher degree of character than on any other, no examination was required of its fire-

men, but their engineers were allowed to have a certain influence in their promotion. On this road the corps spirit was operating in place of formal rules, and you saw and felt its influence on the men.

But no enthusiasm can have any long life without a basis of confidence. If there is to be a true road-spirit on any road, it must be because the men feel that the road has their interest at heart. The road must show its care for its men, and this, too, by strict rules and high standards, as well as by provisions for the sick and disabled. There can be no corps spirit where ignorant men are promoted over the heads of intelligent ones, or where outsiders find their way into the best places, and faithful service is ignored.

Finally, a road which would have loyal men must require a great deal of them as men. It must demand intelligence and character. Those who doubt that more intelligence is needed on our roads will not doubt about the character. Faithful service must be had at any price, but no mere price in money will get it.

Good wages deteriorate as well as raise men, without both enthusiasm and a strong sense of duty to help them up. There is no reason why there should not be a true spirit of intelligent, dutiful enthusiasm on every road where there is a *man* to organize it.

RAILROAD EXTORTIONS were described by Judge Black at the meeting of the Anti-Monopoly League la t Monday with a vigor that was not to be ham pered by any such obstacles as facts. Among other things, he said that the current through rates on freight are so much above a reasonable charge—and he says the roads are entitled to a fair profit on the capital invested in them—last year must have been "the enormous amount of $675,000,000 extorted from the pockets of the people in one year, enough to pay half of the national debt; and this is only on the through freights." Now we cannot say what the earnings, much less the profits, on through freights were in 1880; but in 1879 the gross earnings of all the railroads in the United States from all freights, through and local, were $386,676,000, or $288,000,000 less than what Judge Black says was the amount of "extortion"—of profit more than was reasonable—on the through freight alone; and their earnings from freight and passengers were but $529,000,000, or $146,000,000 less than the through freight extortion. Their aggregate net earnings were a little less than $220,000,000—not one-third of the "extortion." If Judge Black's statement of the amount of the extortion was right, the railroads, instead of receiving anything, should have aid at least $288,000,000 for the privilege of carrying freight. But as he elsewhere asserted that the chief extortions were on local freight, doubtless something will have to be added to this.

It might be supposed that such gross misstatements as these will so discredit the speaker that his utterances will have little effect. But we venture to say that this identical statement will form the text of hundreds of editorial articles and will be quoted in speeches and newspapers for five years to come, and that of the thousands of newspapers that publish this part of Judge Black's speech *not one* will copy the figures that refute it, unless urged to do so by influential persons. The fact that the statement is bold and startling causes it to be widely copied and commented: the fact that it is absurdly false will not be deemed to have such a "public interest" as to make it worth while to say so.

Judge Black's speech abounded in statements that were just as false as this, though not always so absurd. Every sentence in it, almost, shows that the speaker is as ignorant as a child of the elementary principles of the transportation business; and yet he deliberately comes forward and attempts to advise the public to take radical measures in dealing with a property and business that represents nearly five thousand milion dollars of capital, and on whose effective working the prosperity of the whole community largely depends.

THE DEVELOPMENT OF TELEGRAPHS in the United States was recently investigated with considerable care and pains by a gentleman who has given us the following as the result of his inquiries, made of the people best informed in the dif ferent telegraph companies:

	—Miles of—			—Miles of—	
Year.	Line.	Wire.	Year.	Line.	Wire.
1848.....	2,000	3,000	1866.....	53.403	108,245
1850.....	14,675	22,013	1870.....	77,298	130,780
1853.....	17,583	26.375	1877.....	.111,652	257,974
1860.....	29,412	50,294	1880.....	142,364	350,008

Thus, from 1860 to 1870, the period including the war, there was an increase of 162 per cent. in the length of line and 220 per cent. in length of wires, and from 1870 to 1880 an increase of 84 per cent. in miles of line and 119 per cent. in miles of wire, and in the three years from 1877 to 1880 the increase was no less than 27½ per cent. in line and 35½ in wire, and this at a time when the country would seem to have been already pretty well supplied. There are now 350 people in the country to one mile of line and 143 to one mile of wire.

By the same investigation, it appeared that at the end of 1880 there were about 14,000 telegraph offices in the country, and 24,000 employés, sending 50,000,000 messages yearly.

THE AUSTRO-HUNGARIAN RAILROADS, as shown by the letter of Mr. Kupka, published on another page, include about 11,800 miles of road, of which 2,145 miles are owned by the governments of the two kingdoms or the common government, and no less than 7,620 miles of the corporation roads are guaranteed by the state, leaving but little more than 2,000 miles in whose profitableness the state has not a direct interest. How complicated the relations of the railroads with the state have been there is very well shown by the letter. Most of the railroads, through state guarantees and contracts, have truly been government enterprises, the execution of which was intrusted to corporations, but for which the state felt itself to a great extent responsible, so that it has intervened to prevent bankruptcy when the companies were no longer able to pay interest on their bonds. This is as if the state of New York or the United States government had advanced the money to pay interest on Erie or Northern Pacific bonds during the time they were delinquent. Under such circumstances it is natural that the government should dictate to a great extent the policy of the railroads, and be inclined to manage directly, as a state system, the lines whose credit it has had to sustain.

SAN FRANCISCO GRAIN EXPORTS receive little attention this side of the Rocky Mountains, though they have long been important, and this year are especially so, on account of the enormous California crop, most of which is reported to be still on hand. Still in January last San Francisco exported more wheat than New York and much more than any other Atlantic port. Of the total exported from the United States that month 37.2 per cent went by way of San Francisco, 34.4 by New York, 14.5 by Baltimore, 5.5 by Philadelphia, 3.4 by New Orleans, 1.7 by Boston, and 1.5 by Portland (Oregon). But San Francisco exports no other grains in appreciable amounts. The average value of wheat exported from San Francisco is reported by the Custom-house as 85 cents; of that from New York, $1.12½. The movement at San Francisco has very little effect on the carriers on this side of the continent, except that a great crop there, as anywhere else, tends to keep down the price and increase the demand for vessels to make the long voyage from San Francisco to Liverpool. The latter has caused ocean freights from San Francisco to rise to a point never known before.

The Fontaine Locomotive.

Our readers will be interested in the engraving of this engine, which we publish with this number of the *Railroad Gazette*. We have no very definite reports of the operation of this machine, but credit must be given to the inventor for having the courage of his convictions, and of building an engine according to this plan, and paying the cost of it himself. It has been employed for some time on the Canada Southern Railway.

The following are its principal dimensions. It is to be regretted that the diameter of the driving-wheels has been omitted, but the omission was discovered too late to supply the required dimension before going to press.

Gauge of road	4 ft. 8½ in.
Total wheel-base	21 ft. 5 in.
Total weight of locomotive in working order	62,000 lbs.
Total weight on driving-wheels	32,000 lbs.
Diameter of driving-wheels	
Diameter of upper friction wheel	72 in.
Diameter of lower friction	56 in.
Diameter of truck-wheels	42 in.
Diameter of cylinder	16 in.
Stroke of cylinder	24 in.
Outside diameter of smallest boiler ring	48 in.
Size of grate	62⅛x33¾ in.
Number of tubes	140
Diameter of tubes	2 in.
Length of tubes	11 ft.
Square feet of grate surface	14½
Square feet of heating surface in fire box	100
Square feet of heating surface in tubes	806
Total feet of heating surface	906
Exhaust nozzle—single or double	Double.
Diameter of nozzle	3 in.
Size of steam ports	12x1¼ in.
Size of exhaust ports	14x2½ in.
Throw of eccentrics	5 in.
Outside lap of valve	¾ in.
Inside lap of valve	none.
Size of main driving-axle journal	7½ in.
Size of truck-axle journal	5 in.
Capacity of tank	2,000 gallons.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends have been declared as follows:

Delaware & Bound Brook (leased to Philadelphia & Reading) 1½ per cent., quarterly, payable Feb. 21.

International & Great Northern, 5 per cent. on the second-mortgage income bonds from the earnings of 1880, payable 2½ per cent. March 1, and 2½ per cent. Sept. 1.

Foreclosure Sales.

The *Petersburg Railroad* is to be sold in Petersburg, Va., April 20, under a decree of foreclosure under the mortgage of March 1, 1872, by order of the United States Circuit Court. The sale will include the entire road from Petersburg, Va., to Weldon, N. C., 64 miles, with the franchises and all property of the company, and is made subject to the prior mortgage for $500,000. By the last report there were $487,500 bonds outstanding under the mortgage of 1872, and $53,500 under a later mortgage. In 1879 the road earned $202,987 gross and $54,767 net. It has been in the hands of a receiver nearly four years.

The *Spartanburg & Asheville* road will be sold at Spartanburg, S. C., April 4, under a decree of foreclosure granted by the United States Circuit Court. The road is completed from Spartanburg, S. C., to Hendersonville, N. C., 48 miles and some work has been done towards Asheville, 19 miles further. The authorized issue of bonds was $670,000; most of them were issued or hypothecated for iron. The grading was chiefly paid for by county bonds issued in aid of the road.

ELECTIONS AND APPOINTMENTS.

Atlantic & Pacific.—The following appointments have been made: Train-Master First Division, T. O. Stevens; Train Dispatcher, D. Hardy; Road-Master, Alexander J. Devany; Superintendent of Motive Power and Machinery, G. B. Simonds; General Material Agent, A. W. Phelps; Yard-Master, M. Knapp.

Canadian Pacific.—This company has been organized by the contracting syndicate by the appointment of George Stephen, of Montreal, President; Duncan McIntyre, of Montreal, Vice-President; Hon. J. J. C. Abbott, Counsel; Messrs. Stephen, McIntyre, Angus and Hill as Executive Committee; Charles Drinkwater, Secretary and Treasurer; A. B. Stickney, General Superintendent of the Western Division.

Central, of New Jersey.—At a meeting of the board, held Feb. 17, Sidney Dillon and Jay Gould were chosen directors, in place of E. C. Knight and Edwin Clark, resigned. The board then elected F. S. Lathrop President, in place of E. C. Knight, resigned. Mr. Lathrop is Receiver of the road. The Executive Committee was also reorganized and is now as follows: G. G. Haven, Frederick A. Potts, F. S. Lathrop, Jay Gould, Sidney Dillon.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. Charles F. Hatch has been appointed General Superintendent. He was at one time General Superintendent of the Lake Shore & Michigan Southern, then General Manager of the Eastern Railroad, and for some time past General Manager of the Minneapolis & St. Louis.

Delaware, Lackawanna & Western.—At the annual meeting in New York, Feb. 23, the following directors were chosen: George Bulkley, Southport, Conn.; John I. Blair, Blairstown, N. J.; Benjamin G. Clarke, Jersey City, N. J.; Wm. E. Dodge, Moses Taylor, George Bliss, Percy R. Pyne, Samuel Sloan, Wm. Walter Phelps, Wilson G. Hunt, E. W. Holbrook, E. S. Higgins, Sidney Dillon, Jay Gould, Russell Sage, New York. Messrs. Dillon, Gould and Sage are new directors, succeeding S. B. Chittenden, Alfred L. Dennis and Wm. Ryle. The board re-elected Samuel Sloan President; Frederick F. Chambers, Secretary; Frederick H. Gibbens, Treasurer.

Grand Trunk.—The Chicago & Grand Trunk road having become a division of this road, its general officers are retired. Mr. W. H. Pettibone, Assistant Superintendent of the Chicago & Grand Trunk, has been appointed Superintendent of the Chicago & Grand Trunk Division, in place of Mr. H. Funnell, with headquarters at Battle Creek, Mich. Mr. L. E. Snively, who has been General Freight Agent of the Chicago & Grand Trunk, will not leave the service of the Grand Trunk, but will be provided for with some other responsible position. Mr. F. A. How, General Agent of the Grand Trunk, will hereafter be General Agent of both lines, and Mr. J. M. Whitman, the General Western Passenger Agent, will have charge of the passenger business at the Chicago end of both lines.

Lake Shore & Michigan Southern.—Mr. Joseph S. Graham is appointed Master Mechanic of the Buffalo Division. He has been some time Foreman of the Elkhart shops.

Lehigh Coal & Navigation Co.—At the annual meeting in Philadelphia, Feb. 21, the following were chosen: President, E. W. Clark; managers, Francis R. Cope, Francis C. Yarnall, Fisher Hazard, Charles Parrish, Chas. Wheeler, George Whitney, John Leisenring, James M. Willcox, Edward Lewis, T. Charlton Henry, Samuel Dickson.

Marietta & Cincinnati.—At the annual meeting in Cincinnati last week the following directors were chosen: W. T. McClintick, Wm. Waddle, Chillicothe, O.; George Hoadly, H. C. Smith, R. M. Bishop, W. W. Scarborough, J. D. Lehmer, W. B. Loomis, John Waddle, Theodore Cook, W. W. Peabody, Cincinnati; Robert Garrett, Baltimore. Messrs. Cook and Peabody are new directors, succeeding Larz Anderson and Thomas Whitridge. The board re-elected John Waddle, President; Charles F. Low, Secretary; W. T. McClintick, Treasurer.

Memphis & Vicksburg.—The officers of this company are as follows: President, E. Martin; Directors, J. F. Baum, H. D. Bauman, E. C. Carroll, L. A. Campbell, S. Fischell, W. Gibbons, John A. Klein, L. Richardson.

Mohawk & Lake Erie.—The directors of this new company are: Wm. V. Reynolds, Schaghticoke, N. Y.; John L. Wellington, Eagle Bridge, N. Y.; W. W. Sheed, Morristown, N. J.; William Foster, Jr., E. C. Benedict, Henry J. Davison, George Lewis, Jr., H. S. Winans, E. F. Bacon, Enos Wilder, New York; William L. Burt, George L. Ward, Estes Howe, Boston.

Northern Pacific.—A St. Paul dispatch says that Mr. R. M. Newport has been appointed Land Commissioner, in place of J. B. Power, resigned. Mr. Newport has been for some time Auditor of the company.

Ogdensburg & Lake Champlain.—Mr. A. A. Gaddis has been appointed General Manager and will have the active management of the road. It is understood that President Averell's resignation is withdrawn. Mr. Gaddis was for many years Boston agent of the Erie and lately Traffic Manager of the Boston, Hoosac Tunnel & Western.

Providence & Worcester.—The following circular from Superintendent W. E. Chamberlain is dated Providence, Feb. 14:

"Mr. C. A. Wetton is appointed Auditor of this company, vice Mr. W. A. Leete, resigned.

"Mr. W. A. Leete is appointed Assistant to the Treasurer, and will continue to perform the duties of Paymaster, as heretofore.

"Mr. Wetton will have entire charge of the accounts of this company. Agents and other employés will please give proper attention to his directions, and render their reports as prescribed by him. His office will be in the passenger depot of the company at Providence. Appointments take effect March 1, 1881."

Rochester & Pittsburgh.—The following circular is dated Feb 15:

"Mr. George E. Merchant has been appointed General Manager of this company. All officers and employés will obey his orders accordingly."

Mr. Merchant was formerly Superintendent of the Dakota Southern.

Stroudsburg & Wind Gap.—At a recent meeting the following were elected: President, Henry Fulmer; directors, B. K. Jamison, Philadelphia; John O. Wagner, Wilson Kistler, Thomas M. McIlhaney, George Bull, Charlton Burnett, Frank A. Page, Charles Fetherman, Stroudsburg, Pa.

Taylor's Falls & Lake Superior.—At the annual meeting in Taylor's Falls, Minn., Feb. 15, the following directors were chosen: John Martin, W. D. Washburn, Charles F. Hatch, C. C. Washburn, L. W. Folsom, George W. Seymour, Oscar Roos.

Texas & St. Louis.—The following circular from the President is dated Feb. 1:

"By order of the Executive Committee, J. W. Brown is hereby appointed General Superintendent of this company, to take effect from Feb. 1, 1881.

"Major C. F. Stephens is hereby relieved from the duties of Superintendent, and as Chief Engineer will have charge of construction, and such other duties as may be assigned to him by the President or General Superintendent.

"All officers, agents and employés will report to the

General Superintendent, and his orders will be obeyed, as by authority of the President.

"Major Stephens has been relieved by his own request; and the President hereby desires to express the thanks of the Executive Committee to him for the faithful and efficient manner in which he has discharged his duties while acting as Superintendent."

Toledo, Delphos & Burlington.—Mr. W. T. Brownson has been appointed Superintendent, in place of I. H. Burgoon, resigned. Mr. Brownson has been for some time Master of Transportation of the Cairo and St. Louis.

PERSONAL.

—Mr. E. C. Knight has resigned his position as President and a director of the Central Railroad Company, of New Jersey. Mr Edwin Lewis has also resigned as a director.

—Mr. Darius F. Wood, well known as a skillful mechanic, and formerly on the Boston & Albany and later on the New York Central, died in Albany, N. Y., Feb. 16, aged 60 years.

—Captain John Devereux, for many years a sea captain and a respected citizen, died in Marblehead, Mass., Feb. 10. He was father of Gen. J. H. Devereux, President of the New York, Pennsylvania & Ohio, and the Cleveland, Columbus, Cincinnati & Indianapolis companies.

—Mr. W. C. Pendleton, private secretary to Mr. W. O. Hughart when he was President of the Pittsburgh & Connellsville, and lately Chief Clerk to the Superintendent of Schools of West Virginia, is now Chief Clerk to Superintendent John F. Miller, of the Pittsburgh, Cincinnati & St. Louis.

—Mr. Albert Dwight Briggs, for 11 years past a Railroad Commissioner of Massachusetts, died at his residence in Springfield, Feb. 20, aged 61 years. Of him the Springfield *Republican* says: "Mr. Briggs represented the self-made New Englander. He was born at Guilford, Vt., and the family moved to Springfield when Dwight, as he has been called, was 14 years old. The bright, earnest boy lived in the family of Rev. Dr. Peabody, did chores, attended school, helped the old folks and educated himself sufficiently to begin life as a civil engineer. He was engaged in the construction of the Boston & Albany Railroad, under Gen. Whistler, and afterward helped build the Connecticut River Railroad; held a position in the Springfield Car & Locomotive Works; went into bridge-building with D. L. Harris, the firm doing a large business in the Howe bridge, until Mr. Harris left that occupation; and of late years he has been in partnership with John R. Smith. Mr. Briggs had good mechanical skill, was a superior draughtsman, and achieved success in his professional work. He was admirably fitted to discharge the duties of Railroad Commissioner, to which office he was appointed in 1870. The board is composed of one learned in the law, a business man, and an expert engineer—so that the burden of work naturally falling to Mr. Briggs has been large. He wrote those portions of the annual reports relating to the construction and method of operating railroads, and Charles Francis Adams, Jr., and Gov. Long both bear the warmest testimony to Commissioner Briggs' capacity and efficiency.

"Mr. Briggs was a valuable citizen to the community in which he lived, putting conscience, generous sympathies, and an agreeable readiness into the discharge of the debt we all owe to society. He served two terms as Mayor in 1865-7, making a popular official, and being handsomely re-elected. His administration was at the beginning of the era of great school buildings. The philanthropic sentiment which made Mr. Briggs in late years president of our Union Relief Association led him when Mayor to display unwonted care for the inmates of the old alms-house, and to take a helpful interest in the truant school children, attempting somewhat the work now systematically done by the children's aid society. It was characteristic, too, that when the Elm street school-house was built, the great elm was saved from destruction chiefly by the personal efforts of Mayor Briggs, always an ardent lover of nature, who appreciated the sacrilege of such an act as too few of those in authority have done. Mr. Briggs has been for years President of the cemetery association, was a valuable member of the commission which constructed our water-works and a director of our Third National Bank and the fire and marine insurance company. He exhibited his patriotism in many ways during the war, and sought to do his duty intelligently in politics. He was a pillar of the Unitarian church. Though not trained in the schools, the life which we have sketched made Mr. Briggs a well educated man—through contact with nature, affairs, with men and good women, and his genuine love for and considerable and discriminating acquaintance with literature. He acquired much botanical knowledge, and was president of the county horticultural society, an organization once well known.

"Dwight Briggs was a man of thorough probity and uprightness. He was one to be entirely trusted by whoever had dealings with him. His manly and handsome face and fine presence seemed the fitting exponent of a character which was manly and true to the core, and marked by genial companionships, hearty humor and very warm affections. Shortly before settling in Springfield, Mr. Briggs was married to Miss Caroline Clapp, of Northampton They have three sons. With the family of Mrs. Briggs sister, Mrs. Merrick, a joint household was established here, which, though invaded with a year by the death of Mrs. Merrick, has remained the common home of the two families. Few houses in Springfield have become better known as a centre of active benevolence and sympathetic ministrations, and a home whose ample hospitality matched the beauty of its inner life."

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Feb. 12 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1874	2,467,174	1,096,025	2,222,595
1875	1,331,820	782,616	1,350,303
1876	2,145,420	1,481,478	1,982,284
1877	1,419,072	1,111,317	1,906,159
1878	2,676,554	2,004,448	4,151,378
1879	2,850,118	1,639,882	4,713,985
1880	4,279,151	1,997,667	2,377,028
1881	2,460,285	1,639,703	2,001,199

Compared with corresponding weeks of previous years the receipts of the Northwestern markets are the smallest for three years, and smaller than in 1874 even; their shipments are the smallest for four years, and the Atlantic receipts are the smallest for four years, and smaller than in 1874 (when the winter movement was much larger than ever before).

Comparing with previous weeks, it is nearly three years since the Northwestern receipts were so small, but the Northwestern shipments were a trifle smaller the week before and have been smaller four times since navigation closed. The Atlantic receipts were smaller once this year (the second week of January), but with that exception not for a year. Doubtless, snow blockades have had a considerable effect on the movement.

Of the Northwestern receipts for the week Chicago had 40.1 per cent., Peoria 16.2, St. Louis 14.1, Toledo 13.7, Milwaukee 7.8, Detroit 4.4, and Cleveland 3.7 per cent. Peoria has an unusually large proportion of the whole.

Of the Atlantic receipts New York had 32.4 per cent., Baltimore 32.1, Philadelphia 17.8, Boston 10.4, Portland 3.9, New Orleans 2.7, and Montreal 0.7 per cent.

Exports from Atlantic ports for five successive weeks have been:

	Week Ending.				
	Feb. 16.	Feb. 9.	Feb. 2.	Jan. 26.	Jan. 17.
Flour, bbls.	120,932	89,284	123,920	147,994	131,278
Grain, bush.	2,476,801	2,194,050	2,029,828	2,101,331	1,623,952

The aggregate exports for the last four weeks are very nearly the same as for the four weeks preceding, and the aggregate for the eight weeks this year is about 6½ per cent. less than for the corresponding eight weeks last year. There is an increase of 73 per cent. in flour and of 26⅝ per cent. in wheat, but a decrease of more than 50 per cent. in corn.

Railroad Earnings.

Earnings for various periods have been reported as follows:

	1880.	1879.	Inc. or Dec.		P. c.
Year ending Dec. 31:					
Minn. & St. Louis.	$819,557	$471,243	I.	$348,314	74.0
St. Paul & Duluth.	596,113	555,775	I.	40,338	7.3
Month of December:					
Minn. & St. Louis.	$66,953	$52,383	I.	$14,570	28.0
St. Paul & Duluth.	45,706	32,974	I.	12,732	38.6
Month of January:					
	1881.	1880.			
Ala. Gt Southern.	$56,991	$55,401	I.	$1,590	3.1
Central Iowa	66,169	....		.....	....
Cleveland, Mt. Vernon & Del.	32,519	34,192	D.	1,673	4.9
Gal., Har. & San Antonio.	116,768	103,140	I.	12,628	13.2
Lake Erie & Western.	105,178	49,494	I.	55,684	112.5
Mem. Paduc'h & N.	18,897	19,328	D.	431	2.2
Nash., Chat. & Gt. L.	178,143	205,634	D.	27,491	13.4
Net earnings	40,214	.....		.....	....
Og. & Lake Champ.	24,902	30,202	D.	5,300	17.6
Paducah & E'town.	42,402	36,900	I.	5,502	14.9
Second week in February:					
Chi. & Eastern Ill.	$29,571	$21,741	I.	$7,830	32.8
Northern Pacific.	19,655	19,315	I.	340	1.8
Week ending Feb. 11:					
Great Western	$93,526	$85,490	I.	$8,036	9.4
Week ending Feb. 12:					
Grand Trunk	$192,728	$190,667	I.	$2,061	1.1

Milwaukee Steamer Line.

A dispatch from Milwaukee says: "The announcement was made here to-day by D. Edwards, General Freight Agent of the Flint & Pere Marquette Railway, that this company has just contracted with the Detroit Dry Dock Company of Wyandotte, to have built three iron propellers. These vessels are to run between this city and Ludington, and will be 900 tons burden, and costing $120,000 each. Mr. Edwards is here settling up the St. Albans loss."

Coal Movement.

Coal tonnages for the week ending Feb. 12 are reported as follows:

	1881.	1880.	Increase.	P. c.
Anthracite	525,645	375,172	150,473	40.1
Semi-bituminous	64,134	....	.. ....	....
Bituminous, Penna	54,127	....	.....	....
Coke, Penna	43,794	....	.....	...

Anthracite trade is improving rapidly, as the facilities for shipping are better from the clearing out of ice blockades.

Clearfield shipments are very large just now. Cumberland reports show a decrease, which amounts to 30.2 per cent. thus far this year.

The official accountant's statement of anthracite tonnages for January, differing somewhat in form from the weekly statements, is as follows:

	1881.	1880.
Phila. and Reading	392,158	397,292
Lehigh Valley	330,757	320,134
Central of New Jersey	236,814	279,778
Delaware, Lacka. and Western	269,327	280,429
Delaware & Hudson Canal Co	187,073	266,222
Pennsylvania R. R. Co	155,742	96,164
Pennsylvania Coal Co.	70,836	86,531
New York, Lake Erie & Western	29,938	37,716
Total	1,672,645	1,764,316

Decrease for the month, 91,671 tons, or 5.2 per cent. Only two companies show a gain—the Lehigh Valley and Pennsylvania Railroad—the latter a very large gain. The loss in tonnage is chiefly due to the effectual closing of navigation during the past month.

The stock of coal on hand at tide-water shipping points on Jan. 1881, was 417,885, and on Dec. 1880, 500,273 tons, making a decrease of 82,388 tons.

The rise in the Ohio last week took out a large fleet of coal barges carrying about 3,000,000 bushels of coal and coke for points down the river, chiefly for Louisville and Cincinnati.

Commissions on New Orleans Passenger Business.

The following joint circular, issued by the Chicago, St. Louis & New Orleans and the Louisville & Nashville Railroad Company will explain itself:

"An agreement entered into by the undersigned for the protection of passenger rates in the city of New Orleans reads as follows:

"Article 3. We hereby agree that we will issue a joint circular respectfully requesting and demanding that our connecting lines discontinue the payment of commissions, salaries or any other compensation whatsoever, to any scalper or ticket agent in the city of New Orleans; and we also hereby agree that if, after due notice of this agreement has been given them, this request is not complied with, we will withdraw from sale the tickets of any such offending lines from all coupon stations on our respective roads, and that we will not resume the sale of tickets so withdrawn until ample assurance has been given us by the lines so offending that the spirit and letter of this agreement will be complied with.

"This agreement to take effect Feb. 15, 1881."

Central Freight Association.

A meeting was held in Indianapolis, Feb. 16, for the purpose of forming an association to secure full rates on freight and regulate competition as far as possible in the district north of the Ohio and from the Mississippi east to Buffalo and Pittsburgh. No action was taken on account of the absence of some important lines, and the meeting adjourned until March 4, at Chicago.

RAILROAD LAW.

The Right of one Railroad to Cross Another in Illinois.

The Illinois Supreme Court has recently filed its opinion in the case of the Chicago & Western Indiana's suit to condemn land for the right of way across the Lake Shore & Michigan Southern's tracks in Chicago. The following abstract of the opinion we copy from the Chicago *Tribune*:

"The claim made by the plaintiffs in error—the Lake Shore road *et al.*—that the General Assembly has no power to take private property from one owner and transfer it to another, and that it is only where the taking is 'for public use' that the power of eminent domain can be exercised, and therefore property in 'public use' in the control of one corporation cannot be taken for the same public use by another corporation is unquestioned. To justify such taking it is essential that the new use be a different one from the old, and that the change from the old to the new be for the benefit of the public. The new use in the case at bar may be a public benefit, and it is clearly not the same use. Under the present use the public has a benefit in the passage of freight and passengers along railroad lines already constructed. By the new use the public will enjoy the same benefit in another direction. Heretofore the premises have been exclusively used by plaintiffs in error. The new use is a joint one, or rather a co-operative one, to be enjoyed by both parties to the action. It is an error for the plaintiffs to assume that both uses are identical, and their view cannot be sanctioned.

"It is also suggested that only private property is subject to such condemnation, and that the property in question—the crossing near Sixteenth street—cannot be regarded as private, and is therefore not condemnable. It is contended that the property in question is so peculiarly conditioned that it cannot be appropriated for another public use—if at all—only by legislation. This is a grave misconception. The right of taking power is inherent in sovereignty, which in this case is the state. 'The exercise of the power shall never be so construed or abridged as to prevent the taking by the General Assembly of the property and franchises of incorporated companies already organized and subjecting them to the public necessity, the same as of individuals.' This is a simple declaration that such property is subject to eminent domain, and like private property protected by the limitation that private property shall not be taken without just compensation.

"It is also said that there remains the inseparable objection that neither ways nor means have been provided by the Legislature for the condemnation of such crossing, and it is suggested that some tribunal should be invested by law with the power to fix the point, manner and working of the crossing. Before the adoption of the present constitution the Legislature had the power to make special laws granting the right to lay down railroad tracks at any given place, and had also the power of fixing by commissioners the compensation to be paid for property taken for public use, etc. Then it was the apparent policy of the state to permit the construction of no railroad until its terminal points were specially sanctioned. The fixing of termini and the general route still left to the corporation the fixing of the particular location of the line. It was also the policy of the state to fix by commissioners the compensation to be paid for the right of way, and the points of crossing of other railroads were also determined by the commissioners. After the adoption of the present constitution the route and termini could no longer be specially sanctioned in each case by the Legislature, because it would then become special legislation. The Legislature was directed to provide by general laws for the organization of all 'corporations to be hereafter created.' The Legislature passed the present general law in relation to railroads and the right of eminent domain. Under this law the appellee herein (the Western Indiana) was organized and empowered to establish its termini and select its route, and to cross or intersect any other road upon the grounds of such other road. In case the crossing cannot be obtained by consent or agreement, the law provides that a compensation be made as provided for in the general law of eminent domain. The language of the statute is general, and was made so for the purpose of embracing all possible cases that might come properly under it, and is applicable as fitly to the case in bar as to a case where a crossing was sought for over private property.

"The contention that the statute does not prescribe the point and manner of crossing, and therefore no condemnation can lawfully be had, is a mistaken view of the meaning of the statute. The law is that the railroad seeking the proposed crossing must select the place and manner, and must state the same in the petition for condemnation, and on this basis the compensation is to be awarded by a jury.

"The question whether it is wise to permit such railroad to select its own route and choose the point and manner of crossing other roads was a political question for the legislature to determine, and that determination cannot be reviewed by the courts. The appellants denounce this power as dangerous to the rights of corporations and the best interests of the public. When carefully considered it is not an unbridled power. The Legislature seem to have been convinced that whenever it would prove profitable to a railroad company to pay full compensation for its right of way, such railroad would always prove of such public benefit as would justify the taking of the right of way upon the payment of just compensation. And for the same reason the Legislature granted the power to one railroad to cross another. Experience has shown that in taking private property the railroad companies have been careful to inflict as little damage as possible, so as to reduce the compensation to be paid, and the legislature, it is presumed, believed that the same policy would prevail in the manner of crossing other railroads. In a word, the whole matter was left to rest on the law of commerce and trade; that money and capital will always seek and generally find the channels in which it can safely be used to the greatest profit and upon the judgment of the Legislature that the greatest public good will result from allowing it to do so.

"It is asserted in the bill that incalculable damages will be inflicted upon the appellants. This difficulty is encountered in all condemnations where property is taken for a future use. Against this a court of chancery cannot relieve, and we find no sufficient ground for the intervention of a court of chancery in the case at bar.

"The decree of the Court below is therefore affirmed."

THE SCRAP HEAP.

Locomotive Building.

The Rogers Locomotive Works, in Paterson, N. J., have lately shipped engines to the Wabash, St. Louis & Pacific, the Louisville, New Albany & Chicago and other roads, besides several to South America and Cuba.

The Hinkley Locomotive Company, in Boston, has just completed three yard engines for the Fitchburg road, and has a number of orders on hand.

The Danforth Locomotive Works, in Paterson, N. J., are building 10 engines for the Cincinnati Southern; 15 for the Texas & Pacific; 6 for the Indiana, Bloomington & Western;

10 for the Delaware, Lackawanna & Western, and orders from other roads are on the books.

The Pennsylvania Railroad shops at Altoona are building an engine with 18 by 24 in. cylinders and 6 ft. 6 in. driving wheels. The boiler and fire-box are of unusual size. It is intended to run fast passenger trains on the New York Division.

The Mason Machine Works, at Taunton, Mass., are very busy both in the locomotive and the machine departments, with many orders on hand.

C. W. Pickering & Co., in Philadelphia, are filling some large orders for springs from Eastern locomotive shops, and have much other work on hand.

Car Notes.

The Keith Manufacturing Co., at Sandwich, Mass., is building a lot of flat cars for the Fitchburg road.

The Ohio Falls Car Co., at Jeffersonville, Ind., is building 250 freight cars for the Wisconsin Central road.

The Ohio & Mississippi shops have lately completed a very handsome diving car for use on the road. It was built under the charge of Master Car-Builder J. P. Coulter.

The Hibberd patent draw-bar is being introduced on the freight cars of the Ohio & Mississippi road.

Kingsley & Ashley, of Raleigh, N. C., have contracted to build 200 box cars for the Raleigh & Gaston road.

Bridge Notes.

A company is to be organized at Ithaca, N. Y., to build iron bridges, the intention being to erect shops in which 250 men can be employed. The sum of $125,000 has already been pledged, the largest subscribers being Henry W. Sage, Frank Cornell and Gov. A. B. Cornell.

A charter has been applied for to build an iron railroad and highway bridge over the St. John river at St. John, N. B. The bridge will be a large and expensive one.

Iron and Manufacturing Notes.

It is announced that Mr. George Westinghouse, Jr., has bought for himself and associates a controlling interest in the stock of the Union Electric Signal Co. Mr. Westinghouse becomes President of the company.

The Edgar Thomson Steel Co., besides building two new blast furnaces, will soon add a new Bessemer converter, of 10 tons capacity, to its plant.

Mr. Charles C. Newton has opened the Newton Machine Works, at Nos. 2,341 and 2,343 Callowhill Street, Philadelphia, for the manufacture of fine machine tools and special tools of all kinds.

The Vulcan Iron & Nail Works in Chattanooga, Tenn., having been transferred to the new corporation, the Powell Iron Co., the nail mill has already been started up, and work will soon be resumed in the other departments on spikes, track-bolts, fish-plates and light rails.

The Shenandoah Iron Works, in Page County, Va., have in operation a blast furnace and a bloomery. Charcoal is used for fuel, and local ores mined near the furnace.

The Longdale Iron Co. is running the Lucy-Selina Furnance, in Allegheny County, Va., on local ores, with coke for fuel.

The Oakdale Iron Company will soon begin to build a charcoal blast furnace at Hunnicutt, Tenn., on the Cincinnati Southern.

E. B. Moore & Co., of St. John, N. B., have an order for 400 tons of spikes for the New Brunswick Railroad.

A correspondent of the Pittsburgh *American Manufacturer*, from Gore, O., in the Hocking Valley, writes as follows, under date of Feb. 14: "Thomas Iron Works Furnace, at Gore, made during the year 1880 6,588 tons of iron, and was stopped 49 days; Winona made 6,045 tons, and was stopped 112 days; Baird made 3,885 tons, and was stopped 3 months. Baird is the smallest furnace in the valley. Gore is next smaller, and was built for a 17-ton furnace. Baird uses all native ores. Gore and Winona use a mixture of native and Lake ores. The output of the other furnaces in this valley cannot be obtained at present. Winona Furnace was stopped for two months on account of scarcity of native ore, but has again resumed operations. Lee Furnace is now making 39 tons iron per day. Helen has not yet started."

The Washburn & Moen Manufacturing Company, at Worcester, Mass., is putting up a new one-story wooden building, 350 by 60 ft., to accommodate 50 barb fence machines, which will add 20 to those now in use. An engine room 40 by 45 ft. will also be built.

The Rail Market.

The market is active, with large sales, but prices continue at about $60 per ton for long orders up to $62.50 for early deliveries.

Iron rails are unsteady, and manufacturers are disposed to ask higher prices. Quotations are $47.50 to $48 per ton at mill for heavy sections, up to $49 to $51 for light rails. English rails are offered at $44 to $47 at tidewater for 56 lbs. section.

Old iron rails are unsettled, with small sales at $28 to $29.50 per ton in Philadelphia, and about the same in New York.

Fish-plates are quoted at $2.40 per 100 lbs.; spikes, $2.75, and track-bolts $3.25 to $3.75, according to specification.

Notes.

In reporting to the Board of Trade on the recent accident near Leeds, Col. Yolland remarks that the alterations which the Midland Company made at the end of 1872 in the station-yard were not reported to the Board of Trade and were never inspected. He suggested that the company has made itself liable for that omission to the daily penalty of £20, which would amount altogether to close upon £60,000.

One of the ludicrous incidents connected with a recent accident on the Canada Southern Railway was that of a man who was thrown through one of the windows of a sleeping-car in his night-shirt. He was the first person that Conductor Macomber saw after reaching terra firma, wildly gesticulating and whooping at the top of his voice: "A dollar for the man who brings me my pants!" Then minute after minute he grew more and more chilled and every now and again he added 25 cents to his offer until it reached $2.75. Having got to this figure he declared that he would not give another cent, and proceeded to inquire from those around him whether they could not furnish him with the desired garment.

The Railroad and Warehouse Commissioners of Illinois call the attention of the railroads in this state to the non-observance on the part of some of the roads of that section of the railroad law that provides that trains shall come to a full stop at a distance of not less than 200 ft., nor more than 800 ft., from bridges and crossings. The full penalties attached for the violation of this section, the Commissioners say, will hereafter be inflicted on the lawbreakers.

English Machine Notes.

An instance of the perfection which marine engines have reached is furnished by the cable-ship *Kangaroo*, which ran recently from New Zealand to St. Vincent without once stopping. The distance of 9,500 miles, supposing about 16 miles to be run every hour, represents continuous work for 25 days—a fairly sufficient testimonial to the excellence of the machinery.—*English Mechanic.*

A "new gas" has been introduced for lighting the large engineering and boiler-making works of Messrs. Duncan, Stewart & Co., Glasgow. Col. A. P. Chamberlain is the inventor, and the process of manufacture is thus described: In the works a furnace about 3 ft. square and 5 ft. in height has been erected within a small shed, and outside the shed is a gasometer, about 5 ft. in diameter. The furnace contains three retorts, and these are supplied with a combination of mineral oil, water, and air, which enter through a small pipe carried from the back to the front of the retort, and the gas finds an exit through a large pipe at the back of the retort. The vapor is carried to the purifier, which occupies about 2 ft. by 1 ft. of space on the floor behind the furnace. Thence it is carried into the gas-holder, and then led through the old pipes in the works to the various machines and benches in the shop, supplying about 500 burners. The gas gives a whiter and purer light than that of coal gas, or something between that of coal gas and the electric light.—*English Mechanic.*

New Zealand Narrow-Gauge Railways.

A correspondent of the *English Mechanic*, who has written some very interesting letters to that paper about the railroads of New Zealand, in a recent letter says:

"At this date we have slightly over 1,200 miles of government railways in New Zealand, either open for traffic, or ready for opening. To these may be added two private lines, making a total of nearly 1,300 miles. All are of 3 ft. 6 in. gauge, and are laid with Vignoles rails, mostly of either 40 lbs. or 52 lbs. weight to the yard. The lighter rails have proved a grave mistake, involving excessive cost in maintenance, and are being replaced as fast as financial considerations will permit by the heavier rails, or by 53 lb. steel rails.

"In former letters I have expressed regret that the English standard gauge of 4 ft. 8½ in. was not adopted here instead of a fancy gauge of 3 ft. 6 in., but I am compelled to admit that experience has furnished much evidence in favor of the narrower gauge from particular circumstances, while it has been clearly shown that when the time comes for rapid traveling to be needed, this can be attained, to a very fair extent, even on our 3 ft. 6 in. railways. Of these I have already given instances from my own observations. It is notorious, however, that with narrow-gauge lines go steep gradients and sharp curves.

"At the risk of being deemed presumptuous I cannot help remarking that these very severe gradients and curves seem to me no less an error in judgment than the excessively light rails. I feel convinced that had less weight been attached to extreme cheapness in cost of construction a substantial saving would have been effected both in maintenance and working expenses, irrespective of the immense gain to the public convenience. No real economy is attained by sacrificing everything to cheapness in prime cost. For this can only be justly estimated by the annual cost, whether for interest on capital or for maintenance and working expenses. Thus, if the increase in the two latter exceeds the saving in the former, there is an actual loss instead of gain. Experience has already proved this to be the case with our railways. Some portions are laid with 72 lb. rails, and have easy curves and gradients. The saving in maintenance and working expenses on these portions greatly exceeds the loss in interest on their greater original cost. In my humble opinion the colony would have been the gainer in the long run had our lines been built with no gradients steeper than 1 in 70, no curves sharper than 10 chains radius, and no rails lighter than 52 lbs.; 60 or 70 lb. rails being laid where the traffic is heaviest."

Knocking Down a Trestle.

Trestle and other bridges give way now and then, but it is not very often that one train succeeds in knocking down *two miles* of trestle. It was done last week, however, on the Charleston & Savannah road, at the approach to the Savannah River bridge, according to the following account, published in the Charleston *News* and *Courier*, and given to that paper by one of the train-men:

"I am the wood passer on engine No. 19, which was attached to the ill-fated freight train that fell through the Savannah River trestle on Thursday night. The train was composed of 20 freight cars loaded with cotton, lumber and perishable articles. The engine weighed about 36 tons, and was in good order. We were crossing the trestle, and running not faster than nine miles an hour when the timbers gave way, and the engine and train quietly settled down into the swamp. The engine went down first backwards and the cars settled behind her. There was a very severe shock, but neither the engine nor the cars left the track. Not even a coupling nor a coupling pin was broken. I was in some way knocked senseless, and did not know anything for three or four minutes. I received a severe blow over the left eye, my back was bruised, and my left leg strained. When I recovered consciousness, I heard the engineer, Jimmie Wilkinson, calling for a bucket of water, and the train at the bottom of the swamp. Ed. Wilkinson, the fireman, was also hurt by the fall, but his injuries are not very serious. When the engine went down backwards the strain on the benches of the trestle was so severe that they gave way, and the falling of one bench weakened the connecting timbers, and caused *two miles* of the trestle to fall. The crash took place about five minutes before 9 o'clock. It was so dark that we did not notice the track when it began to give way.

"The conductor, Mr. C. C. Murphy, and three train hands, Benjamin Wigfall Sims and Thomas Hutson, white, and a colored man named Aleck, were in the conductor's cab, at the extreme rear of the train. The brakes were worked in the cab, and not on the top of the train, as is sometimes the case on freight trains. When the shock of the falling trestle was first felt the conductor and train hands thought that the cab had run off, but that the engine was still on the track. The engine was within 50 yards of solid ground when the accident occurred. After the train had fallen, Conductor Murphy walked to Hardeeville and sent a dispatch to Savannah, saying that the train had gone through the trestle."

Paint from Steel Scale.

The *English Mechanic* says paint from steel scale is one of the latest additions to the many anti-all-sorts-of-things paints. The scales which fall from steel plates and bars, as they are passed through the rolls, are collected and finely ground. They are then mixed with oil and coloring matter.

OLD AND NEW ROADS.

Atchison, Topeka & Santa Fe.—Work is being pushed on the line between Ft. Thorn, N. M., and the junction with the Southern Pacific is and it is expected that in a few days the connection will be completed. Work is also progressing on the 70 miles down the Rio Grande from Ft. Thorn to El Paso, with the intention of finishing the line as soon as possible.

Work on this company's Sonora road, from Guaymas to Hermosillo, in Mexico, is progressing steadily. A large part of the 87 miles is reported graded, and tracklaying is in progress.

Atlantic & Pacific.—The end of the track of this road is now 2½ miles east of Bluewater, N. M., and 107½ miles from Albuquerque. There has been some delay from the contractors not completing some rock cuts in time, but it is expected that by March 10 the track will be laid 137 miles to Crane's Ranch, which is to be the end of the First Division. A regular train will be put on and the division opened for business. Grading is nearly ready for the track for 50 miles further, and the grading parties are at work in Arizona. In that territory a large part of the grading will be done by a force of Mormons under John W. and Brigham Young, Jr., who have the contract for a large section. There are now on the road four Baldwin and six Taunton engines, all 16 by 24 in. cylinders, and four more Taunton engines are expected.

Baltimore & Ohio.—It is reported that this company will extend its Wheeling, Pittsburgh & Baltimore Division from Washington, Pa., east to Belle Vernon, on the Monongahela and thence into the Connellsville coke region.

California Southern.—This company has been organized to build a branch from the Atlantic & Pacific in California to San Diego. The company has received as a bonus a large tract of land for terminal purposes in San Diego. The stock has been fixed at $1,500,000, and the bonded debt is limited to $25,000 of 6 per cent. bonds per mile. The securities are now offered in Boston on the following terms:

"The company offers, in connection with this subscription to its stock, $2,087,000 of these first-mortgage bonds at the rate of $18,000 per mile, to cover the estimated cost of the first 116 miles of its road, reserving in the treasury of the company bonds at the rate of $7,000 per mile. There will also remain unsubscribed for an amount of capital stock equal to $7,000 per mile, which, together with the reserved bonds or their proceeds, will be used, as the company may direct, in paying the interest upon bonds, should there be any deficiency in the net earnings during construction and early operation, and in the construction and improvement of terminal facilities and further development of the road, as the necessities of traffic may demand. Each subscriber of $1,100 will receive ten shares of the par value of $100 each of the capital stock of the California Southern Railroad Company, $1,000 in the said bonds in the same company, and one share of the capital stock of the San Diego Land & Town Company, promptly delivered, and two additional shares of the last-named stock when the same shall be received by the railroad company in exchange for that part of its land subsidies now held in trust for its benefit.

"The stock of both companies to be issued under this circular will be fully paid.

"All subscriptions must be made in sums of $1,000 or multiples thereof."

Canadian Pacific.—The bill providing for the transfer of this road to the syndicate has become law, and the company has been organized. The substance of the contract has been heretofore noted.

Central, of New Jersey.—The rumors that Jay Gould had taken a large interest in this company have been confirmed by the election of Messrs. Gould and Dillon to the board in place of the two Philadelphia directors, Messrs. Clark and Lewis, who resign. The board has appointed a committee to arrange for western connections for the road. It is said that plans are under consideration for a connection with the Delaware, Lackawanna & Western and its new Buffalo line, and also for the use of the Reading to Williamsport and the construction of the projected Jersey Shore, Pine Creek & Buffalo road.

Work is to be begun as soon as the weather will permit on the Chester Hill Branch, which will extend from a point on the High Bridge Branch of this road to the Marsh and Craig mines near Chester, N. J. It will be about three miles long.

Central Pacific.—A dispatch from San Francisco, Feb. 22, says: "A bill in equity was filed yesterday in the United States Circuit Court, by C. P. Huntington, to restrain the Central and Southern Pacific railroads and their branches from paying, and tax collectors in the different counties through which they pass from collecting, the taxes levied on the basis of the assessment fixed by the State Board of Equalization. Fifty suits have been drawn, covering every mile of railroad owned by the two companies in this state. The complainant alleges that the tax and assessment are void on constitutional grounds: First, because the bill under which the assessment was made embraced more than one subject; second, because the clause of the constitution dividing the executive, legislative and judicial powers of the government is infringed by the act of the Board of Equalization; third, because the Board did not assess the property at its actual value; fourth, the Board did not assess the improvements separately, as the law provides. Judge Sawyer granted the restraining order, summoning the defendants to show cause why an injunction should not be granted, returnable next Monday."

It is understood that the government will not press the dividend injunction suit, preferring to leave the whole matter to the incoming administration.

Central Vermont.—In the United States Circuit Court at Burlington, Vermont, Feb. 22, Judge Wheeler read his decision in the case of Judith H. Andrews, of Boston, a holder of Vermont Central mortgage bonds, against John Gregory Smith and the estate of the late Joseph Clark, of Milton, Receivers of the Vermont Central railroad, which was argued some time since at Rutland. The suit was brought to compel the defendants to render in the Federal Court an accounting of their administration of the railroad property. The defense was a plea of lack of jurisdiction, the same cause being pending in the state court. Judge Wheeler decided against the defendants, holding that they are liable to an accounting to the Vermont Central bondholders in the United States Court. The amount directly involved in the case is $350,000, and as the decision affects the whole administration of the road for the last 20 years, the amount involved in the aggregate is many millions of dollars. The defendants have taken an appeal to the United States Supreme Court. The next case taken up, and which is now on trial, is that of Colman & Johnson, of Boston, against the Vermont & Canada Railroad. The question at issue is whether the Vermont & Canada's indorsement of the notes of the Vermont Central is valid, and the amount involved is $10,000.

Charlotte & Camden.—It is proposed to build a railroad from Charlotte, N. C., south to Camden, S. C., about 80 miles, connecting with the Camden Branch of the South Carolina road. The object is to make a direct line from Charlotte to Charleston, in connection with the proposed extension of the Virginia Midland to Charlotte.

Chicago & Grand Trunk.—The separate organization of this road has ceased, and it will hereafter be worked as a division of the Grand Trunk and under the general officers of that road.

Cincinnati & Eastern.—The Common Pleas Court of Clermont County, has discharged the Receiver of this road, dating from March 1. All the indebtedness has been funded into second-mortgage bonds, except about $3,000, which will be cancelled when due. The company expects to build 20 miles of road the coming summer, and possibly 44 miles

which takes it to Portsmouth. There will only be $8,000 per mile of bonds on the 100 miles of road—$5,000 of first and $3,000 of second mortgage bonds. The road is now considered by its owners worth at least $12,000 per mile.

Connecticut Western.—It is stated that the floating debt of this company has been reduced from $172,000 to about $46,000, and that there is about $28,000 cash on hand, leaving only about $18,000 unprovided for. Most of the claims, however, have been paid in bonds at 40, and the bonded debt has been increased about $250,000 in clearing off the floating incumbrances.

Galveston, Harrisburg & San Antonio.—Notice is given that the trustees under the first mortgage have drawn by lot 48 bonds for redemption by the sinking fund. These bonds will be paid on presentation at the company's office, No. 58 Sears Building, Boston, at any time within 30 days from the sixtieth day following the date of notice. The numbers drawn are 53, 121, 246, 314, 437, 543, 671, 710, 801, 893, 1035, 1164, 1252, 1353, 1416, 1493, 1646, 1731, 1800, 1948, 2086, 2163, 2190, 2310, 2509, 2526, 2631, 2783, 2910, 2972, 3067, 3156, 3294, 3402, 3426, 3580, 3678, 3733, 3808, 3948, 4037, 4197, 4210, 4383, 4429, 4572, 4657 and 4747. It is, however, optional with the holders of the bonds drawn to present them for payment or not, and any bond not presented within said 30 days will be and remain as if it had not been drawn.

Gainesville, Ocala & Charlotte Harbor.—A considerable force is now at work on the grading of this road from Palatka, Fla., to Gainesville. Iron for this section has been bought and equipment ordered.

Georgia Western.—The Atlanta (Ga.) *Constitution* reports that the charter for this road has been bought from the Louisville & Nashville Company by ex-Senator John B. Gordon. The purchase and the building of the road from Atlanta westward into Alabama is part of a plan which Gen. Gordon is now engaged in for a railroad from Atlanta to Birmingham, Ala., and thence to Columbus, Miss. He is said to represent parties with abundant capital.

Hoosac Tunnel & Saratoga.—This company has filed articles of incorporation to build a road from Troy, N. Y., to Saratoga Springs, with a branch to Schuylerville, making about 40 miles in all. It is intended to be an extension of the Boston, Hoosac Tunnel & Western road.

Jacksonville, Mobile & Pacific.—Articles of incorporation have been filed in Florida for a company which proposes to buy the Florida Central and the Jacksonville, Pensacola & Mobile roads, and to extend them westward to Mobile and thence to the Mississippi. It is claimed that the organization is in the interest of the Dutch bondholders of the Florida roads, but there is some doubt as to its real purposes.

Kansas Central.—It is reported that this road has been sold to the Union Pacific. It is now 119 miles long, from Leavenworth, Kan., went to Garrison. It is proposed to extend it further westward to Clay Centre.

Lake Erie & Western.—Reports continue to be circulated of the purchase of a large interest in this company by parties connected with the Chicago, Burlington & Quincy.

The headquarters of the company are soon to be removed from Fremont, O., to Sandusky.

The story that the state of Ohio had a lien upon the right of way and old grade used in the extension from Fremont to Sandusky is officially stated to be without foundation.

Lake Superior & Southeastern.—This company has been incorporated in Wisconsin to build a railroad from Superior City to Chippewa Falls and Eau Claire, and thence to a point on the Mississippi not farther south than La Crosse.

Lehigh Coal & Navigation Co.—At the annual meeting in Philadelphia, Feb. 21, the following resolution was adopted:

"*Whereas*, It appears from the report just read that the company holds 18,900 shares of its own capital stock; and,

"*Whereas*, It is in the opinion of this meeting desirable that the floating debt of the company should be retired by the sale of this stock; therefore

"*Resolved*, That the incoming board of managers be and are hereby requested, at such time and in such manner as they may approve, to offer to the stockholders the said 18,900 shares of stock, at not less than their par value, for the purpose of paying off the entire floating debt of the company."

Mohawk & Lake Erie.—This company has filed articles of incorporation in New York to build a railroad from Syracuse to Buffalo, with branches to Rochester and Suspension Bridge, about 140 miles in all. It is meant to be an extension of the Boston, Hoosac Tunnel & Western.

Nashville, Chattanooga & St. Louis.—The board of directors of the Louisville & Nashville Company has authorized an official denial of the reports that a lease or any guarantee of dividends by that company has been under consideration. It is also denied that any negotiations have been entered into with the outside stockholders.

It is common report that the stock of the company is being quietly bought up in the Louisville & Nashville interest to a considerable extent. Efforts have certainly been made to bear the stock in Wall street, and considerable sales are reported.

The following statement is is published for January and the seven months of the fiscal year, from July 1 to Jan. 31:

	January.	Seven Months.
Gross earnings	$178,143.18	$1,202,886.50
Expenses	137,929.17	758,431.34
Net earnings	$40,214.01	$444,455.16
Interest and taxes	39,410.47	273,724.80
Surplus	$803.54	$170,730.36
Improvement account, Northwestern Division	$65,993.15	
Real estate	15,642.75	
New engines	27,036.10	
New cars	97,960.00	
		206,632.00
Excess of ex. seven months		$35,901.64

The working expenses were 77.42 per cent. of gross earnings for January and 63.05 per cent. for the seven months. The surplus over interest and taxes for the seven months was equivalent to 2.49 per cent. on the stock, but this surplus has been more than absorbed by the improvements of road and equipments.

New York Central & Hudson River.—This company's report to the State Comptroller of New York gives the gross earnings for the half year ending Dec. 31 at $15,140,049.32, on which the State tax will be $75,700.25. This report is somewhat less than the monthly statements (December earnings have not been published) would indicate, and we understand that some parts of the receipts are held not to come under the title of earnings in the meaning of the tax law. This road has included gross receipts for car service and many receipts from sales of old materials as earnings, which is the practice of no other company so far as we know.

New York, Chicago & St. Louis.—It is stated that this company has completed the purchase of 56 miles of the eastern end of the old Wabash and Erie canal; this includes the right of way and valuable real estate in Ft. Wayne.

A contract is said to have been let to Brown, Howard & Co. to build the road from Cleveland to St. Louis and also the line to Chicago. The company is reported to be ready to begin work as soon as the right of way can be secured.

Northern Pacific.—It is reported that the Oregon Railway & Navigation Company is engaged in an effort to secure control of the stock of this company, its chief object being to prevent the building of lines in Oregon which will compete with its own. Large purchases of the stock have been made recently.

Philadelphia & Reading.—Both President Gowen and the McCalmonts have issued circulars to stockholders asking far proxies at the coming meeting. It can hardly be said that either circular contains anything new. Mr. Gowen insinuates, as he has done before, that the opposition are really working to secure control of the property for the Pennsylvania Railroad Company. His statements of the present position of the company contain nothing that has not been published before, and his estimates of its future earnings are as liberal as they have generally been.

The McCalmont circular takes sharp exceptions to Mr. Gowen's statements, and denies emphatically any connection with the Pennsylvania. It speaks strongly against the undertaking by the company in its present financial condition of the doubtful burden of an expensive line to secure a Western connection. It calls attention to the fact that the present managers hold only $16,500 of the company's stock, several of them having barely shares enough to qualify them, while it is claimed that the candidates of the opposition have a substantial interest in the property. The deferred income bond and consolidated mortgage scheme are strongly opposed.

The present indications are that neither party has secured a majority of the stock. The English proxies, outside of the McCalmont stock, have largely gone to Mr. Gowen, and both parties claim to have secured many votes from stockholders in this country. Very probably the result will not be known until the day of the meeting.

Philadelphia, Wilmington & Baltimore.—The Philadelphia *North American* of Feb. 23 says: "The announcement that a controlling interest in the Philadelphia, Wilmington & Baltimore Railroad had been sold to a syndicate of friends of the New Jersey Central, the Reading and the Baltimore & Ohio, backed by Jay Gould, appears to be well founded. Nathaniel Thayer, one of the five Boston directors of the road, has owned the largest single interest in the shares for some years, and President Hinckley is known to have learned yesterday that Mr. Thayer had sold out, which up to last week he had appeared determined not to do. The occasional rumors of the road's sale to the Pennsylvania, ever since there first began to be talk of a rival line between this city and Baltimore, are considered as signs that a struggle to secure it, if it could be had, has quietly been going on for about a year between the two contesting parties, whose respective brokers at Boston snapped up all that was offered on State street, until each side had enough to give entire control to the party that should get Mr. Thayer's stock in addition.

"The sale, which is understood to have been effected Monday, was the consummation of a series of events extending over the recent history of the Delaware Western Railroad. About a year ago a Philadelphia capitalist, who was reported to be acting for the Pennsylvania Railroad, tried to buy a controlling interest in the Delaware Western Railroad, which has the right of extending tracks eight miles in any direction from Wilmington. Colonel H. S. McComb, in the interest of Delawareans who wished to keep the road under Delaware ownership, succeeded in beating the Philadelphian, and getting a controlling interest in the Delaware Western. That veteran railroader soon thought his new purchase would be a valuable link in a rival line from Philadelphia to Baltimore, and formed the idea of having the charter amended, as in the bill now before the Delaware Legislature. He conferred with John C. Bullitt, Esq., counsel for Philadelphia stockholders, and George H. Bates, Esq., for Wilmington stockholders, before deciding on this course. Meantime, knowing of the good terminal facilities of the West Chester & Philadelphia Railroad at Thirty-first and Chestnut streets, he asked and obtained from President Farnham the refusal of an interest in that road, but on account of difficulties in its charter and its total debt of $2,203,044.03, which would have to be assumed, when he could build for less than a million 10 miles of new track as good as the 10 miles of West Chester track which he needed, he concluded not to buy it. Then the Philadelphia, Wilmington & Baltimore authorities, fearing he might change his mind, stepped in and bought two-thirds of the stock in May last.

Colonel McComb, W. H. Vanderbilt and a Philadelphia capitalist, the three persons most interested in the scheme for a new road to Baltimore, then began to negotiate with President Garrett, of the Baltimore & Ohio. He offered to furnish one-fifth of the capital, and demanded 20 per cent. of the stock of the new road for himself, also asking that his New Jersey Central friends should have 15 per cent. The bill amending the Delaware Western's charter was then prepared by Counsellor Bates, and submitted to Mr. Bullitt, Vice-President Robert Garrett, of the Baltimore & Ohio, and Mr. G. G. Haven of New York, a Jersey Central director. They held a meeting in this city, and Colonel McComb deposited his stock with a committee consisting of Mr. Bullitt, Mr. Haven and Mr. John Lowber Welsh, as impartial judges of how it was to be merged with the Baltimore & Ohio. Mr. Robert Garrett, in a letter dated Jan. 21, 1881, and addressed to Mr. Bates and Mr. William G. Whitely, of Wilmington, committed the management of the Baltimore & Ohio to the approval of the Delaware Western bill, and the same thing was done in other ways. The Philadelphia, Wilmington & Baltimore people naturally opposed the bill, fearing, of course, the competition of a direct rival, which must lessen the receipts of the best of railroads. But as circumstances indicated the success of the bill, and particularly after it passed the Senate week before last, the danger of competition appears to have led the management of the Philadelphia, Wilmington & Baltimore to the idea of buying off the opposition, not by removing the comparatively insignificant Delaware Western interest from among the enemy's weapons, but by making the enemies themselves their friends. Mr. Thayer was wrestled with and brought to terms, even while the fight at Dover was hottest. Negotiations were begun with the Baltimore & Ohio early last week.

"Last Friday Colonel McComb went to New York and consulted with Vice-President Garrett, President Canby, of the Delaware Western, and Counsellor Bates. Mr. Garrett laid before them the negotiations with Mr. Thayer and the other leading stockholders of the Philadelphia, Wilmington & Baltimore road residing in Boston, begun at their solicitation through Vice-President Pratt, of the Philadelphia, Wilmington & Baltimore road, for the sale of a controlling interest in the road to a pool headed by Mr. Jay Gould, in which the Baltimore & Ohio is one of the parties. Naturally the Delaware Western people, backed by Mr. Vanderbilt, opposed the bargain, as contrary to the interests of their own road, and insisted on the Baltimore & Ohio's continuing to sustain them. Of course Mr. Garrett insisted with equal strength that he was bound to do what was best for his own road, and not to build a new road when he could buy an old one as good as new. He offered Colonel McComb an interest in the new combination, but it was refused, and the Delaware Western people left New York under the impression that somehow they had brought Mr. Garrett to terms, and that he would continue to aid their bill. Mr. Cassatt, of the Pennsylvania, was also in New York Saturday. Colonel McComb telegraphed to the Philadelphia owner of Delaware Western, whose name has not transpired, that he did not think Mr. Garrett could honorably desert them, in which view Mr. Vanderbilt coincided. Colonel McComb expressed the situation as follows:

"'I met Haven and Garrett at five last evening. Their proposition was verbal, not written, as I insisted it should have been, and is to this effect: Haven and Garrett are to buy control of stock of P., W. & B. at 70, putting us all in, and by working this market are to put it to 100—we reaping the profit and taking the chances in the future for the management of the property which they are to get with the control of the stock now; Gould, I understand to be behind them. Mr. Vanderbilt declines to go into the speculation, and says he went into the project with you and I in the most perfect good faith to build the road as an investment, believing it to be one of the very best railroad openings now unoccupied. He says, which I confirm, that he went in with these parties with the understanding that Garrett or the Pennsylvania should have a chance to come into and participate with us. He is willing now to stand to that agreement, to build with business contract with either Baltimore & Ohio or Pennsylvania, or is willing to go on and build without either, and is further willing to build through to New York if that should become necessary.'

"On Colonel McComb's refusal, the bargain was closed without him, and Mr. Thayer's interest in the P. W. & B., with enough more from Boston, if more was necessary, to make up a controlling interest, was bought by the Gould-Garrett-Haven syndicate. The Delaware people were sure of the Baltimore & Ohio's co-operation for the Delaware Western bill, and insisted all day yesterday that the whole story was nothing but the last kick of the opposition to prevent the passage of the bill. The bill's fate is now considered sealed, unless Mr. Vanderbilt or the Pennsylvania Railroad steps in to save it by offering to complete a new road to Baltimore, which is by no means improbable. * * * *

"President Hinckley last night stated that he had yesterday received a brief telegram from Mr. Nathaniel Thayer announcing that he had disposed of his stock to Messrs. Robert Garrett and G. G. Haven. He also stated that other stock of the company had been purchased sufficient to give the gentlemen named a controlling interest for the corporations which they represented. A prominent official of the Pennsylvania Railroad Company last night expressed some surprise at the news of the sale of the stock. He said that Mr. Hinckley, at a conference of Pennsylvania Railroad officials with representatives of the Philadelphia, Wilmington & Baltimore Railroad Company on Monday, had stated that no sale had taken place, so far as he had any knowledge. According to this it would seem that the first knowledge Mr. Hinckley had of the transaction was when he yesterday received the brief telegram above mentioned from Mr. Thayer at Boston. Mr. Thayer and his son were in town last week, and at that time, it is said, made no reference to the proposed sale of their stock."

The precise figures have not been ascertained, but it is said that Mr. Thayer receives 150 (or $75 per share) for his stock in cash. By the last report there were 231,715 shares ($50 each), and there are also $240,500 bonds outstanding which are convertible into stock at the holder's option. The property is a good one, and has been one of the most stable in America in its earnings, though this, doubtless, is largely due to the fact that it was little exposed to competition.

Later dispatches say that Mr. Thayer receives $70 a share for his stock, and that the purchasers agree to take all that may be offered at that price. The purchasing syndicate is said to consist of John W. Garrett, Robert Garrett, John Lowber Welsh, Drexel, Morgan & Co., Solon Humphreys, Jay Gould, Russell Sage, G. G. Haven and Wm. H. Vanderbilt. It is understood that the interests of the Pennsylvania Railroad Company are protected, and that its use of the road will not be interfered with. It is said that the headquarters of the company will be transferred to New York.

Port Jervis & Monticello.—Arrangements are being made to change this road from 6 ft. to standard gauge. The company is also considering the question of an extension from Monticello, N. Y., north about seven miles to the New York, Ontario & Western near Fallsburg.

Syracuse, Chenango & New York.—The Syracuse (N. Y.) *Standard*, of Feb. 21, says: "Upon the occasion of the recent visit to this city of General W. T. Burt, the representative of the syndicate of Boston capitalists who have bought the Syracuse, Chenango & New York Railroad, he had a conference with ex-Mayor James J. Belden, who, until then, had stood aloof from the negotiations being conducted by A. A. Howlett, President of the Salt Springs Bank. As a result of this meeting on Saturday afternoon, Mr. Belden delivered up the stock and bonds under his control, amounting in all to about $200,000. This places in the hands of the syndicate over two-thirds of the common and preferred stock, making a transfer of the property immediately possible. The sale of the road may now be said to be virtually consummated. A meeting will be held, at which resignations of the present directors now in will be accepted and a new board chosen. In the latter will be representatives of the new owners."

Vicksburg, Shreveport & Pacific.—New Orleans dispatches state that a large interest in this road has been sold to the parties who are now building the extension of the Texas & Pacific and the New Orleans Pacific.

Wabash, St. Louis & Pacific.—The Attorney General of Illinois has given his opinion that the consolidation of the Champaign, Havana & Western with this company is a matter that falls within the jurisdiction of the Railroad Commission under the provisions of the constitution and laws of the state prohibiting the consolidation of parallel or competing roads. A complaint in the case has been made to the Commission, and action will probably be taken in the matter.

Wisconsin Central.—Pursuant to the plan of reorganization, the third coupon upon the preferred bonds, issued under the consolidated mortgage dated Jan. 1, 1879, will be paid upon its presentation and surrender at the office in Boston, on and after March 1, 1881. Persons who hold original "unfunded" first-mortgage bonds issued under the mortgage dated July 1, 1871 (*i. e.*, bonds with all the coupons on and

after July 1, 1875, thereto attached), and who have not yet exchanged them for new bonds issued under the consolidated mortgage, may exhibit their original unfunded bonds and coupons to the Register to be properly stamped and endorsed, and they will then receive upon each such original $1,000 first-mortgage bond an amount equal to its proportion of said third coupon, payable on said preferred bonds, and upon each such original $500 first-mortgage bond one-half of that amount.

ANNUAL REPORTS.

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Burlington, Cedar Rapids & Northern.

In the statement of this road for 1880 given last week an error in a hasty calculation made us say: "The yearly interest charge is $416,920. If this is deducted from the net earnings, it would leave a balance of $192,837.12, which is equivalent to 2.97 per cent. on the stock for the year."

The paragraph, corrected, would read as follows:

The yearly interest charge is $416,920. If this is deducted from the net earnings, it would leave a balance of $292,837.12, which is equivalent to 5.32 per cent. on the stock for the year.

Delaware, Lackawanna & Western.

This company, owning 196 miles of railroad and a great coal property, and leasing or controlling 464 miles of road, makes only the following brief statement for 1880.

The stock and debt are as follows:

Stock	$26,200,000
Bonds	5,677,900
Total	$31,877,900

Stock is unchanged; bonded debt is $209,200 less than a year ago.

The income and expenses were as follows:

	1880.	1879.		Inc. or Dec.
Trans. and coal..	$21,257,891.35	$19,050,469.39	I.	$2,207,421.96
Miscellaneous	398,713.34	1,176,238.65	D.	777,525.31
Total	$21,656,604.69	$20,226,708.04	I.	$1,429,896.65
Trans. and coal..	15,437,060.64	15,598,498.99	D.	161,438.35
Miscellaneous	316,073.00	817,757.32	D.	501,684.32
Total exps	$15,753,133.64	$16,416,256.31	D.	663,122.67
Net earn	$5,903,471.05	$3,810,451.73	I.	$2,093,019.32
Interest and rentals	3,627,381.16	3,624,430.66	I.	2,950.50
Net profit	$2,276,089.89	$186,021.07	I.	$2,090,068.82

Interest and rentals include payments due Jan. 1. Like all the coal companies, this line showed last year a very great increase in net profits, due more to increase of prices of coal than to increase of business.

Illinois Central.

This company now operates 1,320.35 miles of road, whereof 918.19 miles are in Illinois and 402.16 in Iowa. The Illinois lines consist of the Chicago Division, Chicago to Cairo, 364.73 miles; the North Division, Centralia to Dubuque, 340.77 miles; the Springfield Division, Gilman to Springfield, 111.47 miles; the Middle Division, Otto to Colfax and Kempton to Minonk, 101.22 miles. This last division was increased by extensions from Chatsworth to Colfax and Kempton to Minonk, 64.46 miles, opened during the year, though partly built in 1879. The Springfield and Middle divisions, though really owned, are nominally under separate organizations. The Iowa lines consist of a main line from Dubuque to Sioux City, 326.58 miles, and a branch from Cedar Falls to Mona, 75.58 miles; they are leased from three companies, the Dubuque & Sioux City, the Iowa Falls & Sioux City and the Cedar Falls & Minnesota.

The equipment consists of 213 engines; 91 passenger, 12 smoking, 17 sleeping, 12 baggage and smoking, 9 baggage, 4 express, 8 baggage and express, 12 mail and express, 4 baggage, mail and express, 10 postal cars, and 10 old passenger cars not numbered; 2,939 box, 50 Blue Line box, 583 stock, 111 combination grain and stock, 51 fruit, 45 refrigerator, 4 powder, 278 flat, 1,197 coal, and 110 caboose cars; 1 pay, 2 officers' and 18 derrick and tool cars. Net increase during the year was 1 locomotive; 10 passenger, 2 smoking and 3 baggage cars; 123 box, 50 stock, 10 refrigerator, 24 coal, and 6 caboose cars.

The general account is as follows:

Shares		$29,000,000.00
Funded debt:		
Six per cent. currency redemption bonds of 1890	$2,500,000	
Six per cent. sterling bonds of 1895	2,500,000	
Five per cent. sterling bonds of 1905	1,000,000	
Sterling sinking fund, 5 per cent	4,200,000	
Springfield Div., 6 per cent. bonds	1,600,000	
Middle Div., 6 per cent. bonds	200,000	
		12,000,000.00
Investment fund		5,395,089.50
Construction bonds due 1875, not presented		4,000.00
Current liabilities		222,212.54
Insurance fund		45,142.70
Total		$46,666,444.74
Road and property	$35,840,853.61	
Stock and bonds in New Orleans line	9,299,522.43	
Insurance fund	45,142.70	
Current assets, New York and Chicago	1,001,656.66	
Supplies	479,269.34	
		46,666,444.74

Funded debt was decreased during the year by the redemption of $96,000 sterling fives by the sinking fund. The investment fund is represented in securities of the New Orleans line.

Cost of property is made up of $33,000,000 permanent expenditures in Illinois; $1,040,853.61 in Iowa; $1,600,000 Springfield Division cost, and $200,000 Middle Division cost.

The securities in the New Orleans line consist of 66,700 shares, valued at 40 per cent.; $1,600,000 first-mortgage bonds at par, and $5,061,000 second-mortgage bonds, which cost $5,031,522.43.

The traffic reported for the year is as follows:

Train mileage:	1880.	1879.		Inc. or Dec.	P.c.
Passengers	1,717,504	1,561,041	I.	156,463	10.0
Freight	3,459,069	2,928,631	I.	530,438	18.2
Service	191,301	104,693	I.	86,608	82.5
Switching	1,145,737	866,006	I.	279,731	32.3
Total	6,513,611	5,460,371	I.	1,053,240	19.3
Passengers carried.	2,753,544	1,807,744	I.	945,800	52.3
Passenger mileage.	63,306,528	44,586,972	I.	18,719,556	41.9
Tons freight carried	2,703,582	2,324,485	I.	379,097	16.3
Ton miles southward	198,367,516	170,224,546	I.	28,142,970	16.5
Ton miles northward	182,920,966	165,246,314	I.	17,674,652	10.7
Total ton miles.	381,288,482	335,470,860	I.	45,817,622	13.7
Av. train load:					
Passengers, No	36.86	28.56	I.	8.30	29.1
Freight, tons	110.21	114.54	D.	4.33	3.8

The cost of locomotive service was 14.95 cents per mile run, against 14.15 cents in 1879. The average receipts per train mile and per unit of traffic were as follows, in cents:

Per train mile:	1880.	1879.		Inc. or Dec.	P.c.
Passenger	109.50	105.43	I.	4.07	3.6
Freight	182.96	187.96	D.	5.00	2.6
Average, all trains	128.22	132.76	D.	4.54	3.4
Expenses, " "	56.39	55.43	I.	0.96	1.7
Net earnings	71.83	77.33	D.	5.50	7.3
Per passenger per mile	2.51	3.05	D.	0.54	17.9
Per ton per mile:					
North-bound	1.59	1.54	I.	0.05	6.5
South-bound	1.50	1.51	D.	0.01	0.7
Through	1.03	1.05	D.	0.02	1.9
Local	1.69	1.66	I.	0.03	1.8
Average of all	1.54	1.52	I.	0.02	1.3

On the suburban trains between Chicago and Kensington the number of passengers carried in 1880 (included in statements above) was 1,394,912; mileage traveled, 9,677,875; average journey, 6.94 miles. The average passenger trip, excluding the suburban trains, was 39.47 miles.

Of the tonnage mileage for the year, 22.1 per cent. was of through and 77.9 per cent. of local business: 48 per cent. was of north-bound and 52 per cent. of south-bound freight.

The earnings for the year were as follows:

	1880.	1879.		Inc. or Dec.	P. c.
Freight	$5,883,122.58	$5,116,961.90	I.	$766,160.68	14.8
Passenger	1,591,428.53	1,368,525.65	I.	222,902.88	16.3
Mail	148,104.63	142,057.59	I.	5,447.04	3.9
Express	141,268.51	134,025.71	I.	6,640.80	4.9
Sleeping cars	21,156.63	27,927.43	D.	6,770.80	24.2
Rents, storage and dockage	307,403.83	249,185.65	I.	58,218.18	23.3
Switching	45,461.14	42,152.00	I.	3,309.14	7.9
News agency	2,200.00	4,200.00			
Cairo transfer	99,171.64	85,925.94	I.	13,245.70	15.4
Mileage of cars and engines	80,810.52	77,020.59	I.	3,789.93	4.9
Total	$8,322,126.01	$7,249,182.46	I.	$1,072,943.55	14.8
Work'g exps	3,672,971.18	3,026,700.20	I.	646,270.98	21.3
Net earnings	$4,649,154.83	$4,222,482.26	I.	$426,672.57	10.1
Gross earnings per mile	6,302.97	5,772.15	I.	530.82	9.2
Net earnings per mile	3,521.15	3,362.14	I.	159.01	4.7
Per cent. of expenses	44.13	41.75	I.	2.38	

The increase in wages and cost of material was largely the cause of the increased expenses.

The earnings of 1880 were divided as follows, the difference from the above statement being caused by the deduction of $17,314.20 for cost of business done over the Toledo, Peoria & Warsaw:

Gross earnings line owned		$5,336,262.71
Net earnings over C., B. & Q.		483,787.55
" " " T., P. & W.		17,314.20
Earnings over other lines		80,810.52
Cairo wharf-boat and transfer		99,171.64
Springfield Division		345,911.34
Middle Division		166,066.43
Total in Illinois		$6,529,324.39
Leased lines in Iowa:		
Dubuque & Sioux City		$1,097,524.09
Iowa Falls & Sioux City		561,992.51
Cedar Falls & Minnesota		115,970.82
Total		$8,304,811.81
Operating expenses		3,672,971.18
Net earnings		$4,631,840.63
Charter tax paid state of Illinois	$368,348.66	
Taxes, Springfield Div	9,916.15	
" Middle Div	5,085.83	
" Leased Lines in Iowa	60,774.81	
Rentals " " "	708,702.57	
		1,152,828.02
Net surplus		$3,479,012.61

The Land Department reports sales of 35,677.93 acres of donated lands to 792 persons for $212,929.61, besides town lots for $1,015. Sales of purchased lands were made to the amount of $1,648.72. The cash receipts on land account were $178,836.06, of which $156,520.36 were paid over to the treasurer, the balance being used for expenses. Of the total grant of 2,595,000 acres, there remains unsold only 251,505.01 acres, nearly all in Southern Illinois.

The income account was as follows:

Net surplus of road, as above		$3,479,012.61
Land Office		156,520.36
Total		$3,635,532.97
Interest on bonds	$672,600.00	
Less interest collected on New Orleans line bonds	121,031.73	
Balance of interest	551,568.27	
Dividends, 6 per cent	1,740,000.00	
		2,291,568.27
Balance		$1,343,964.70
Construction account in Illinois for 1880		842,323.56
Balance		$501,641.14
Balance at credit of income, Dec. 31, 1879		2,072,839.80
Balance previously at credit of surplus account		504,529.56
Amount to bring stock in New Orleans line forward at 40		2,316,679.00
Total, Dec. 31, 1880		$5,395,089.50

During the year the new tracks for passenger trains between Weldon and Parkside Junction, 6.565 miles, were opened. About 1¾ miles of stone wall were built in Chicago, and a large new dock begun. A viaduct was begun carrying Randolph street, Chicago, over the tracks. A grain elevator of 600,000 bushels capacity has been begun at Cairo.

During the year 9 more heavy engines were built in the shops.

The usual renewals of bridges and buildings were made. There were used 9,255 tons of steel and 513 tons of iron rails, besides 1,241 tons of steel used for new tracks. There were 60.92 miles of track ballasted in Illinois, and 22.95 miles in Iowa. There were 12.29 miles of new sidings laid in Illinois, and 2.42 miles in Iowa.

The report of the directors we have already published, on page 76 of this volume.

Pittsburgh & Castle Shannon.

This company owns a railroad of 3 ft. 4 in. gauge from Pittsburgh to Castle Shannon, 10 miles. There is an inclined plane on the road. The company is a miner and shipper of coal also. The report is for nine months ending Dec. 31.

The assets and liabilities are as follows:

Railroad and equipment		$141,000.00
Coal lands, valued at		55,000.00
Real estate, accounts, etc		74,488.20
Total assets		$270,488.20
Bonds ($61,000) and land mortgages	$78,537.81	
Pay-rolls, accounts, royalties, etc	54,264.35	
		132,802.16
Surplus of assets		$137,686.04
Capital stock		478,950.00

For the nine months 2,179,929 bushels of coal were carried and sold, whereof 300,674 bushels were nut and 345,680 bushels slack. There were 199,041 passengers carried.

The receipts were as follows for the nine months:

Received for coal carried and sold	$115,142.20
Fares, freight, etc., on railroad	11,729.43
Total	$126,871.63
Expenses of all kinds	108,190.38
Net earnings	$18,681.25

The Superintendent's report says that when the present management took possession the road was in poor condition, and several of the bridges were dangerous. They have been repaired and the road-bed much improved.

St. Louis, Iron Mountain & Southern.

This company worked last year 685 miles of road, the main line from St. Louis to Texarkana, with the branches to Belmont, to Cairo and to Potosi, with no change from the previous year. The following figures for the year 1880 are published by the *Commercial and Financial Chronicle* in advance of the full report.

The earnings and expenses were as follows:

	1880.	1879.		Inc. or Dec.	P.c.
Passengers	$1,268,874	$981,151	I.	$287,723	29.4
Freight	4,697,047	4,103,665	I.	593,382	14.5
Mail, express, etc	299,676	207,795	I.	91,881	44.2
Total	$6,265,597	$5,292,611	I.	$972,986	18.5
Conducting transportation	1,277,340	1,073,846	I.	203,494	19.2
Motive power	918,542	700,544	I.	217,998	31.1
Maintenance of cars	341,193	242,148	I.	99,045	40.9
Maintenance of way	1,276,516	684,896	I.	591,620	86.3
Express Dep't	46,747		I.	46,747	
General expenses	214,888	290,622	D.	75,734	26.1
Total	$4,075,226	$2,992,056	I.	$1,083,170	36.2
Net earnings	$2,190,371	$2,300,555	D.	$110,184	4.9
Gross earn. per mile	9,148	7,726	I.	1,422	18.5
Net " " "	3,198	3,368	D.	170	4.9
Per cent. of exps	65.04	56.54	I.	8.50	

The great increase in earnings, and especially in passenger receipts, is notable. It was, however, more than balanced by that in expenses, which was large in every department. It was especially great in maintenance of way, the items of which were as follows:

	1880.	1879.
Repairs of bridges	$102,395	$52,885
Steel rails, less amount credited on iron rails	458,805	67,952
Labor repairing track	414,294	302,539
Other items	301,022	261,520
Total	$1,276,516	$684,896

The *Chronicle* says: "The increase of expenses under the first three heads is natural, as the larger volume of traffic transported of course augmented the transportation expenses. But the expansion in the amount expended in maintenance of way must be treated separately. This amount was in 1880, it will be seen, $1,276,516, or pretty nearly double what it was in 1879. The items given above throw light on the matter. It appears that almost the entire increase can be ascribed to expenditures on account of improvements in the condition of road-bed and track. Thus $458,000 were devoted to steel rails, against only $67,000 last year; labor employed in repairing and improving track consumed $112,000 more than in 1879, and the item of repairs of bridges rose from $52,000 to $102,000, making altogether an increase in these three items of $553,000. Of course the road is now in a better position than ever before to handle its increased and increasing traffic, especially as, in addition to the sums included in operating expenses, the company spent during the year, for new construction and equipment, $1,126,264, principally for new passenger and freight cars, locomotives, rails, stations, bridges, ballast, masonry, grading, etc.

"This discloses a feature in railroad operations at the present time which is not at all peculiar to the Iron Mountain road. During the years of depression following the panic of 1873, many roads, though not actually allowing their property and plant to run down, yet curtailed their expenses, bringing them within the smallest possible compass, and made no new outlays at all. Now that every sign favors a continuance of activity, and promises large accessions to traffic, the roads feel inclined to strengthen their position as carriers, and consequently both ordinary and extraordinary expenses are added to. When this is done the condition of the property is of course improved, but the fact is not always apparent on a mere examination of net earnings. The different items that go to make up the expense account should therefore, we think, receive closer scrutiny now than ever.

"The annual charges of the Iron Mountain, including the interest on the first and second preferred incomes, amount to about $2,065,000, so that the road earned in 1880 $125,000 more than enough to meet its fixed payments. The directors now propose to cut down the annual interest liability by issuing a new consolidated mortgage bearing a lower rate (5 per cent.) of interest to retire all outstanding issues (increasing the amount $2,000,000 to provide for improvements). If this should be accomplished, the annual charge against net earnings would be only $1,604,300. It is well to remember, however, that this is a matter far in the future, for at present prices the old issues realize over 6 per cent. on the investment, and as not any of them mature prior to 1891, it is not likely that the holders will exchange them for a 5 per cent. general mortgage, especially as the earlier issues would thus be placed on an equality with the later issues as regards lien. The capital stock it is proposed to increase from 21½ millions to 35 millions, for the purpose of constructing and acquiring additional branch roads."